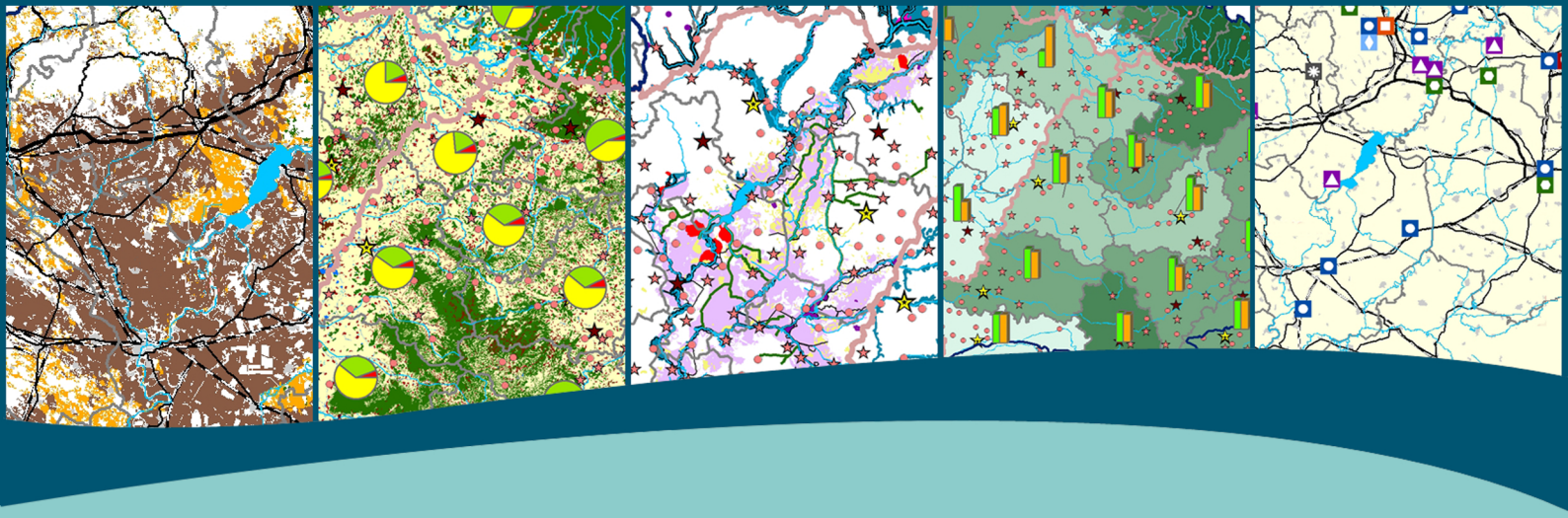

Tisa Catchment Area Development

Pilot Project 3 - Ecological Corridor on Both Banks of Tisa

Jointly for our common future

TICAD

SOUTH EAST EUROPE
Transnational Cooperation Programme

TICAD
TISA CATCHMENT AREA DEVELOPMENT

Programme co-funded by the EUROPEAN UNION

T I C A D

Tisa Catchment Area Development

Pilot Project 3

E C O L O G I C A L C O R R I D O R
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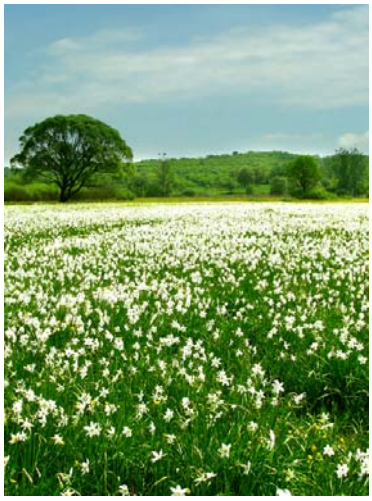

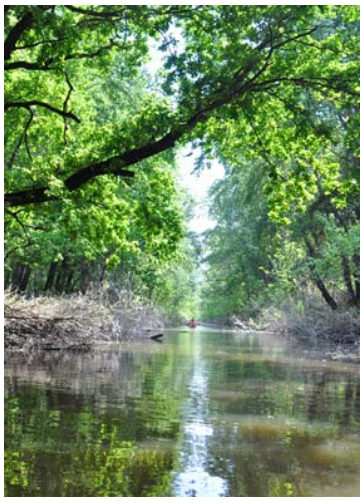

INTERNAL COVER

The Valley of Narcissuses, near Khust, Ukraine |*Photo: Anastasia OLESHCHENKO, 10% PP1*
Cultural landscape in the Land of Maramureş, Romania |*Photo: Lelia PAPP, ERDF_PP3*
Black&WhiteTisas – Junction Point, Ukraine |*Photo: Anastasia OLESHCHENKO, 10% PP1*
Bodrogzug, Hungary |*Photo: Ana Maria POP, ERDF_PP3*

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

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CONTENTS

Purpose

In March 2001, after two significant waves of pollution that arrived from Romania and spread along the Tisa river and certain streams in its drainage system and caused ecological disaster, the decision of the Ministerial Committee of the European Council asked the concerned states (Hungary, Romania, Serbia and Montenegro, Slovakia and Ukraine) to cooperate in order to prevent cases similar to the disasters affecting the Tisa and Someş rivers, including the potential elaboration of an agreement under the auspices of the European Council.

The **aim of the Tisa Catchment Area Development** – TICAD – **trans-national project** is to contribute to the harmonisation of the integrated territorial developments implemented in the river basin, to facilitate the creation of a sustainable economic structure, the optimal utilisation of natural and cultural resources, the development of areas of competitive growth and to promote the establishment of the internal and external functional interdependencies of the network of settlements.

The present document is the **territorial analysis of the area selected for Pilot Project 3 – Ecological route on both banks of the Tisa (RO, UA, SK, HU, SR), "Ecological route – green space"**, elaborated on the basis of a unified and accepted methodology.

The ecological network has a main role in the Tisa region from the aspect of:

- water management and flood control
- preservation and development of the biodiversity
- development of potentials of the ecotourism and eco friendly recreation
- development of sustainable land use in the flood area.

The purpose of the pilot project is to serve as an added value to the trans-national strategy and policy recommendations with information that is completed by locally obtained data and qualitative knowledge as well as a more detailed SDSS scenario analysis.

The general objective of PiP3 is to contribute to the establishment of a continuous ecological route (of varied width) on both banks of the river in order to provide a green space and corridor for eco-friendly recreation and tourism.

The specific objectives of PiP3 are:

- Extension of information, database and integration of relevant local projects
- Testing of strategy scenarios on the pilot area: top-down approach
- Integrating public opinion: bottom-up approach
- Fine tuning of SDSS model with using MIKE SHE software
- Local territorial development strategy building for the area (by using the SDSS tool) including proposals on concrete development measures
- Adding value to the trans-national strategy and policy recommendations

Context

Territories of all the 5 countries participating in TICAD project are included in Pilot Project 3 – Ecological route on both banks of the Tisa, in different shares, according to the following principle: the study area of the pilot project is represented by one NUTS 5[1] unit on each part of the Tisa River. For the larger tributaries at the confluences with Tisa (Someş, Criş, Mureş, Bega, Bodrog and Zagyva) the area should include one NUTS 5 unit on both sides of the tributary.

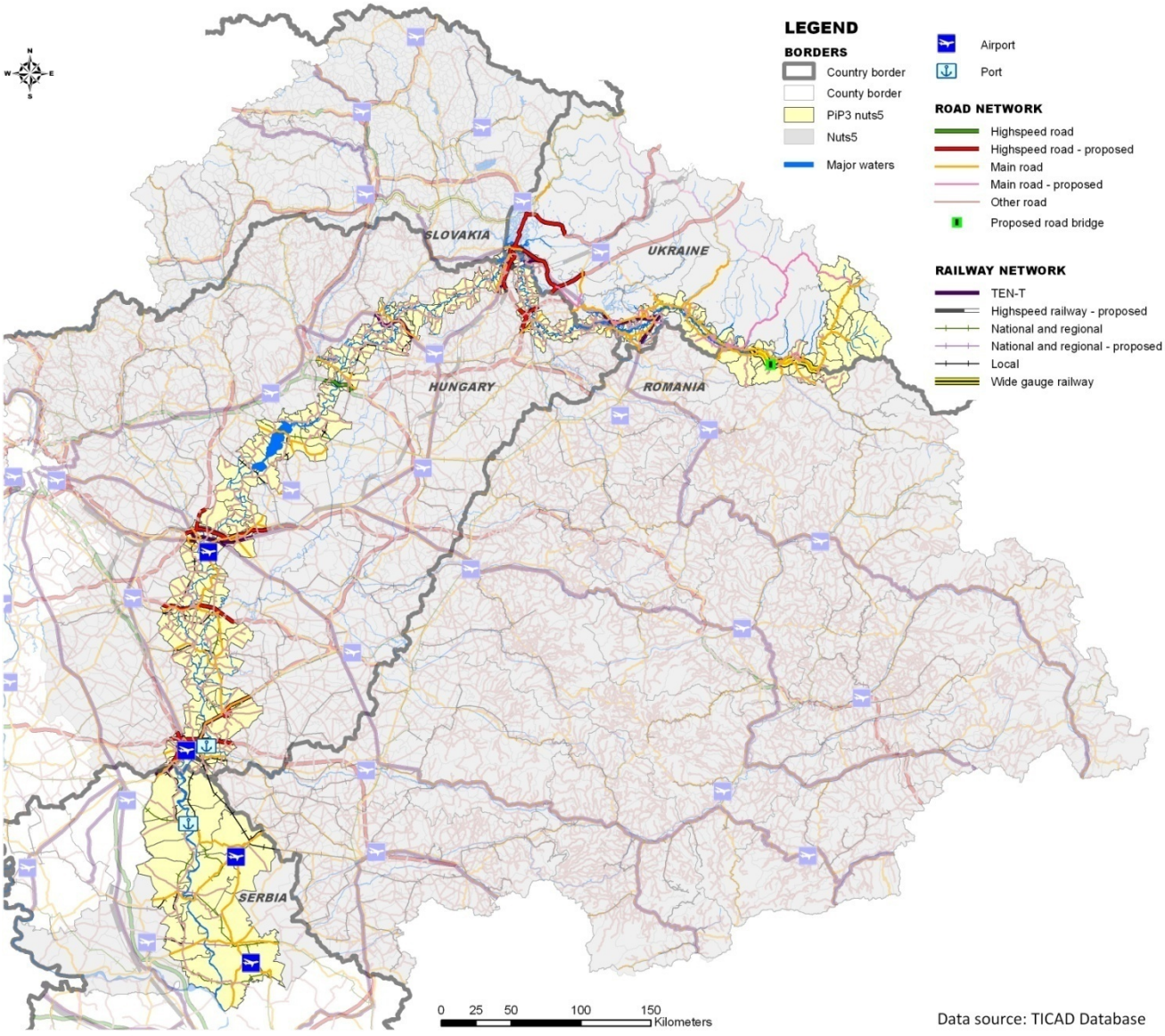


Figure 1. PiP3 area in TICAD territory

[1] For Serbia the database is not available for NUTS 5, so NUTS 4 were used, according to the same principle.

Characteristics of the studied area / Country	Number of NUTS 5 units	Surface km^2	Population[2]	Population density in PiP3 area *inhab./km²*	Share of PiP3 population in PiP3 territory
Romania	9	637.74	67930	106.52	4.57
Ukraine	53	2249	267400	118.89	18.00
Slovakia	2	21.69	2655	122.41	0.18
Hungary	163	7573.09	737148	97.33	19.62
Serbia	91	5412.8	410406	75.82	27.63
PiP3 area	**318**	**15894.32**	**1485539**	**93.46**	

Table 1. Relevant numbers regarding PiP3 area

There are 318 NUTS 5 units, most of them being rural.

Most of the PiP3 territory belongs to Hungary, almost half (47.65%), which also concentrates almost half of the PiP3 population (49.62%). The shares territory – population are proportional; the highest population density is in Slovakia, while the lowest is in Serbia.

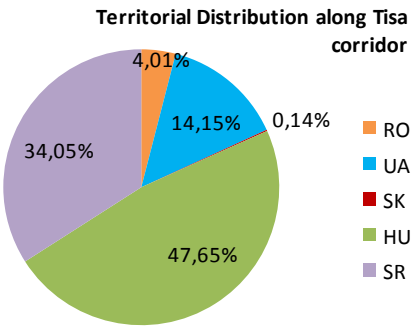


Chart 1. Territorial distribution,by country,in PiP3 area

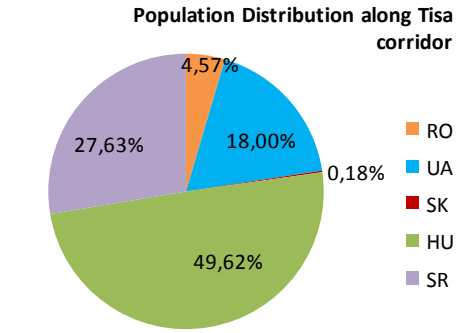


Chart 2. Population distribution,by country,in PiP3 area

There are two types of areas along Tisa:

a. Tisa as a border between countries:

- between the entire PiP3 territory of Romania and part of the PiP3 territory of Ukraine
- in two cases between Ukraine and Hungary
- between the entire PiP3 territory of Slovakia and part of the PiP3 territory of Hungary
- between Hungary and Serbia

The areas in the immediate proximity of the borders are areas with higher security measures and cannot be used for certain activities.

Also, the specific of these areas close to border is that *the ethnic structure is more diverse than in other regions of the country*. In **Romania**, there are large shares of Ukrainean population (in four rural settlements there are more than 50% Ukraineans in the number of inhabitants, even 90.9% in Bocicoiu Mare; in the rural areas, the Ukrainean population is of 48.4%, while in PiP3 area it is of only 21% due to the fact that the urban settlement Sighetu Marmației has almost double population than all the 8 rural settlements and in this, only 3% are Ukraineans; in the rural settlements around Sighetu Marmației, except Bocicoiu Mare, the population is mainly Romanian – more than 80%); there is one settlement (Câmpulung la

[2] Data from 2009; for Serbia the data is from the 2002 census.

Tisa) where 79% of the inhabitants are Hungarian. In **Ukraine**, Berehovo and neighbouring settlements have a high level of Hungarian population and along the Romanian border there is a high share of Romanian population. But still the ethnic structure includes much wider variety of nationalities. In **Slovakia**, the prevailing population in the villages of the target area is of Hungarian national minority[3]. In the **Hungarian** part of the pilot area, the Roma population represents the only significant minority, with very different proportion by settlements. On **Serbian** project territory, Hungarian population, by far, represents the dominant minority. In four municipalities from the pilot project area, Hungarian population is actually majority, logically followed by Serbian population. It is worth noticing, higher than common, the percent of population that declared themselves as Yugoslavian (in some municipalities up to 5%).

b. Tisa as a river across the country:
- in Ukraine, Hungary and Serbia

Most of the settlements along the Tisa corridor are rural and have low number of population. It can be noticed that the number of inhabitants is lower near the borders, meaning that higher population concentrations are towards the core of the country, due to better national connections in all domains, while the crossborder cooperation needs to be strenghtened in order to attract more inhabitants.

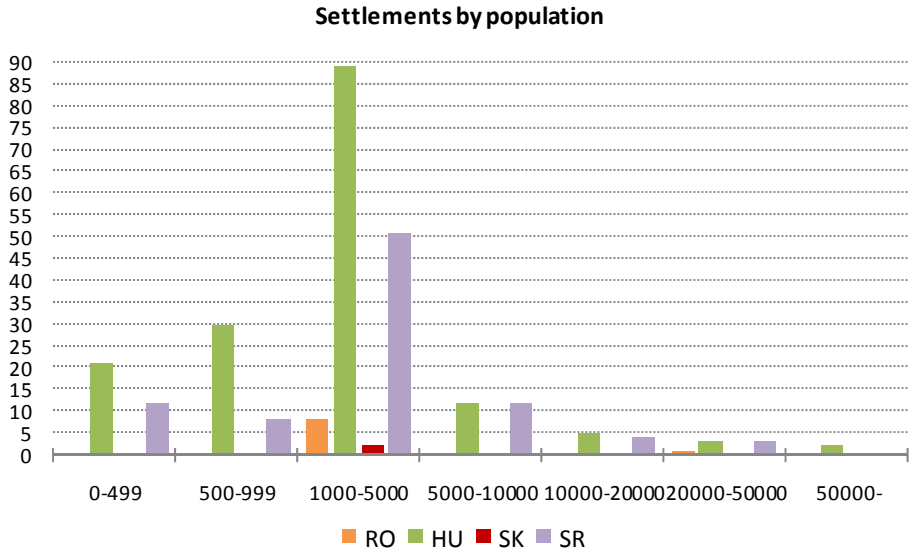


Chart 3. Classification of PiP3 settlements based on the number of inhabitants

For Serbia, the differences between the chart and the map showing the classification of the settlements made by the number of population, appear like this due to the fact that the analysis for the chart was made on a NUTS 5 level, while for the map, the data could be illustrated only on a NUTS 4 level.

[3] In the village Malé Trakany, the Hungarian population represents 87.86% of inhabitants, the following nationality is Slovak (6.36%), Roma minority presents 4.84% and Ukrainian minority presents 0.19%. Similarly in the village Veľké Trakany the prevailing nationality is Hungarian presenting 82.96% and 15.85 % are inhabitants of Slovak nationality. The other nationalities (Roma, Ukrainian, Ruthenian) participate in less than 1%.

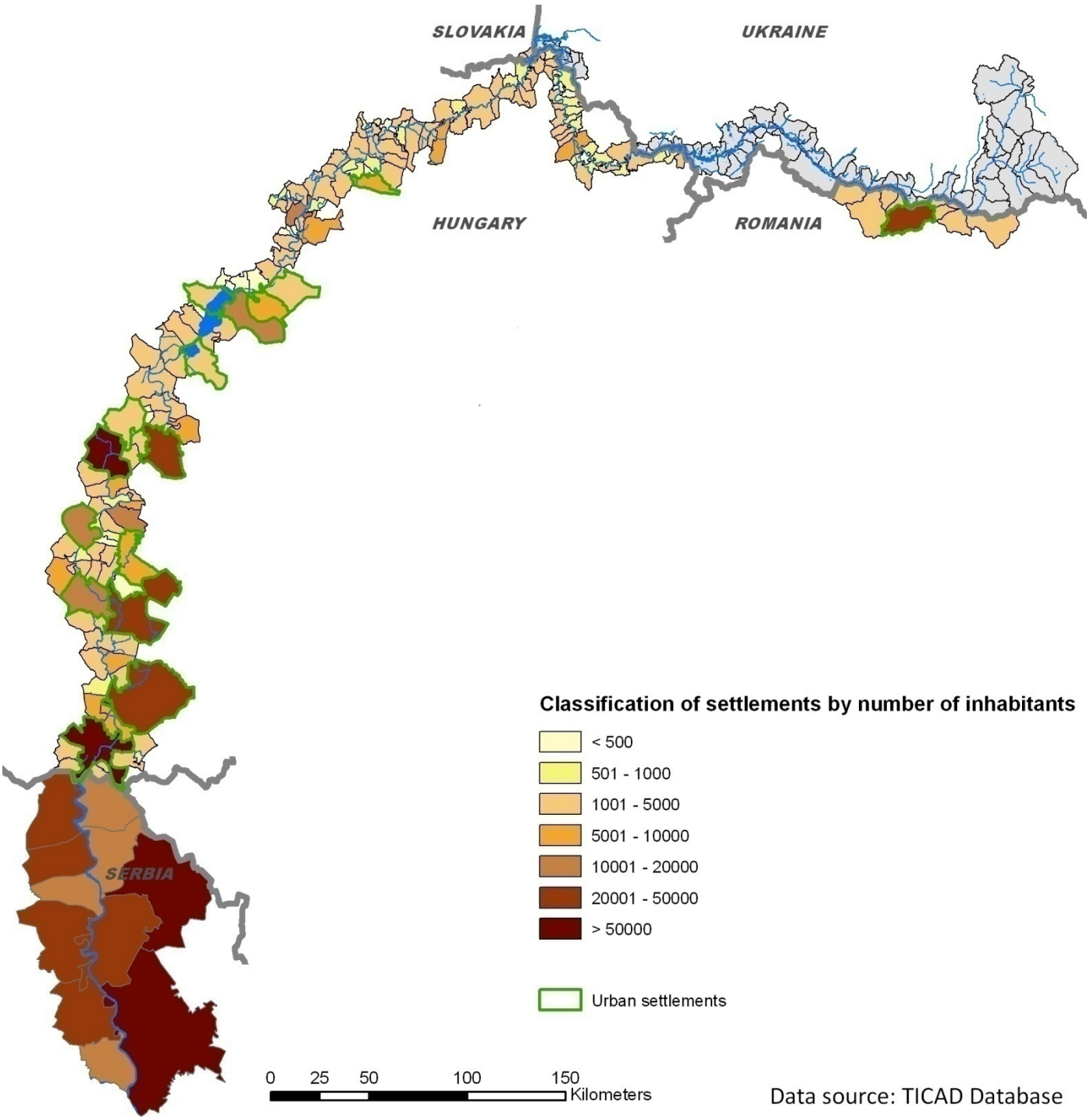


Figure 2. **Classification of PiP3 settlements based on the number of inhabitants**

Romania

The target area covers 9 settlements – 8 rural and one urban.

On Romanian territory, Tisa has a length of 61km, an average slope of 2‰ and a sinuosity index of 1.24. At the level of the ecological route of Tisa River, the drainage network is defined by the main stem, together with a series of tributaries which bring important amounts of water, especially those draining the left slopes (on the Romanian territory). Vişeu, Iza, Săpânța, Baia and Valea lui Francisc are the most important ones among them. The territory belonging to Tisa ecological corridor comprises surface water bodies associated to rivers that entirely reach a good chemical state, without exception.

Ukraine

The target area covers both mountainous and flat areas. That fact in its turn determines all other peculiarities of the area not only natural, but also social, economic, infrastructural and cultural.

Almost the whole target area has a near-border location that has a determinative influence on the region development and perspectives. Also the near-border location determines high share of national minorities in the region.

Tisa River valley is an axis of population concentration of the adjoining region. The population of the target area is 267.4 thousand inhabitants, that is 21.5% of the total population in Zakarpatska Oblast. The settlement structure of the target area includes 2 settlements with population higher then 20000 person – Khust (28382 inhabitants) and Vynohradove (25435 inhabitants) and the city of Rakhiv has population of 15072 inhabitants. These three settlements involve 25.7% of the total population of the target area. Also there are 12 settlements with population 5-10 thousand person involving 36% of the total population of the target area; 39 settlements with population 1-5 thousand persons involving 34.1% of the total population of the target area; and 22 settlements with population under 1 thousand person involving 4.1% of the total population of the target area.

Slovakia

The area (2 villages) is located in the East Slovak Lowland, which is a part of the Great Danube Basin on the borders with Hungary and Ukraine. The selected territory is part of the Bodrog River Sub-basin with the hydrological number 4-30-11-004; it creates 5.6km long section of the Tisa River and its alluvium near the borders with Ukraine and Hungary. The area of the Tisa River basin in Slovakia is 7.32km^2. Certain parts of the alluvium are periodically flooded. There are fragments of floodplain forests and bushes in the target area, the dead river channel (the Old Tisa) formed by river meanders in the past and grasslands. Minor watercourses and canals, like the Somotor Canal significantly influence hydrological situation of the area.

From geological aspect the area is formed by neogene sediments. Fluvisols are the most abundant soil type. Agricultural soils have high content of humus and their vulnerability to water and wind erosion is slight.

Hungary

Within Hungary, the area under study comprises 162 settlements (15 urban and 147 rural) located along the River Tisa. Its total area is 757309ha; of this, 104130ha (13.75%) is located within the embankments. The areas along both banks of the river have been typical agricultural landscapes since the regulation of the river.

The 162 settlements located within the strip along the River Tisa are parts of three statistical regions, seven counties, and 25 micro-regions. The total population of the settlements was of 737148 inhabitants in 2009. The large and medium cities located along the river (Szeged, Szolnok, Tiszaújváros, Szentes, and Csongrád) have a significant economic potential while also attracting tourism thanks to their architectural heritage and cultural landscapes. The river crossing points across the River Tisza and the infrastructure networks that pass through the region are of great importance for this strip of settlements. It is also the region most exposed to flooding. Many parts of its natural environment are very attractive with its high concentration of ancient meanders of the River Tisza surviving as oxbow lakes, surviving marchlands, alkaline lakes, and remnants of alluvial forests. These areas form part of the ecological corridor running along the River Tisza.

The immediate river bed of this river confined within embankments is the most important space for natural and semi-natural habitats. Oxbow lakes and other aquatic habitats are seen everywhere along the entire length of the river. This is the strip most targeted by water sports tourism and ecotourism. Lake Tisa is a special gem of the area. There are other zones of sustainable agricultural development in the region that are characterised by, or suitable for, economic management models like, for example, mixed farming, traditional alluvial farming, or local economy based on the management of the inlets and outlets of the oxbow lakes, with the possible future purpose of presenting them to tourists. However, in many places there remain a number of unsolved problems concerning the buildings located within the floodplain, both in terms of their residential, resort, and tourism related functions and in terms of the environmental load they generate.

Serbia

There are 91 settlements with population of 410406 inhabitants according to 2002 census that spans over three NUTS3 (Severnobanatska oblast, Srednjebanatska oblast and Juznobacka oblast). Settlements are distributed over 11 municipalities (NUTS4). There are 39 settlements located within the river strip with the population of approximately 200 000 people with strong multicultural and ethnic character. There are 8 small size urban centers positioned on the river banks. Some of them function as twin cities as they are set on opposite sides of the river. That brings valuable structuring capacity for the whole river strip in Serbian territory in terms of distribution of services, creation of nodal points for tourism and demographical distribution.

Between the centers, the area has strong agricultural profile.

- **Stakeholder's analysis**

Stakeholders	evaluation criteria						decisions rate of involvement
	interest	strength			influence	sum	
		S	F	P			
Authorities responsible for environment, nature protection and water management	5	2	3	5	10	50	decision-making
Environmental and Water Directorate	5	3	4	3	10	50	decision-making
National Park Directorate	5	3	2	3	8	40	decision-making
Regional and county development councils	3	4	5	5	14	52	decision-making
Municipalities	4	5	1	3	9	36	consulting
Inhabitants	3	5	1	2	8	24	informing
Tourism enterprises	4	2	3	1	6	24	informing
Industrial enterprises	3	2	4	3	9	27	informing
Agricultural enterprises	3	2	3	2	7	21	informing
Enterprises in the field of forestry	3	2	4	3	9	27	informing
Fishing association	4	3	1	2	6	24	informing
Water management corporation	4	2	2	1	5	20	informing
Environmental NGO's	5	3	2	3	8	40	decision-making
Other NGO's	2	3	2	3	8	16	informing
Micro-region (NUTS4) development council	5	3	1	2	6	30	consulting

Table 2. Classification of stakeholders

Interest: strong->weak (5->1)

Strength: strong -> weak (5 -> 1)
S – social, F – financial, P – political

Influence: S + F + P

Sum: interest x influence

Rate of involvement (sum):

- lower than 30 – informing
- between 30 and 40 – consulting
- above 40 – decision-making

Romania

Stakeholders with local interest and authority: the local authorities (1 urban and 8 rural settlements), county authorities (Maramureş County Council and Prefecture, Maramureş County Agency for Environment Protection) and four Ecologist Associations.

Stakeholders with regional interest and authority: North-West Regional Development Agency and other institutions and NGOs with specific domains of activity: water, emergency situations, human and environment protection, tourism.

Stakeholders with national interest and/or authority: the Ministry of Regional Development and Tourism (which intends to legislate TICAD strategy as a development plan for the area), the Ministry of Environment and Forests, the Ministry of Agriculture and Rural Development; also, institutions, agencies and NGOs with specific domains of activity: water, tourism, foreign investments.

Ukraine

Among the **state organizations of national level** the most interested and influential are The Ministry of Environmental Protection and the Ministry of Regional Development, Building and Housing Services of Ukraine.

The **state organisations of local level** have enough high influence on the Project realisation and about 14 of them are interested in it. Among them are The State Department of Environmental Protection in Zakarpatska Oblast; the Operational Administration on Melioration and Water Management of Zakarpatska Oblast; The Department of Forestry and Hunting of Zakarpatska Oblast; Main Department of Land Resources Management in Zakarpatska Oblast; Main Department on European Integration Issues, Foreign-Economic Relations and Tourism of the Regional State Administration of Zakarpatska Oblast etc.

Also **local authorities** – The Regional Council of Zakarpatska Oblast and the local communes (city, settlement and village councils) within PiP3 target area are very interested in the Project and their influence on the Project realisation is the highest among all stakeholders.

There about 35 **non-governmental organisations** whose activities are connected with the Project subject and thus they are interested in its realisation and in some spheres they will profit from it. Their influence might be different. The most powerful in this field and interested in the Project organisations likely are Regional organisations in Zakarpatska Oblast of All-Ukrainian Ecological League, Ukrainian Ecological Association “Green World”, Nature Protection Society, Green Tourism Development in Ukraine Promotion Society, Ukrainian Society of Historical and Cultural Heritage Protection; and also such Regional organisations as Scientific Council on Zakarpattya Development Issues, Society of Small-Scale Business Owners of Zakarpattya, Regional Society of Promotion of Rural Tourism Development in Zakarpattya, Zakarpatska Regional Organisation of Sporting Tourism, Zakarpatska District of Plast – National Scout Association of Ukraine etc.

Also the **research and educational organisations** are interested in the Project. They can play a role of scientific support in the Project realisation and somehow profit from it. The most important is The Carpathian Biosphere Reserve which is partly situated within the PiP3 target area and is the most influential scientific centre in the region in field of nature protection and management. Also Uzhorodskyi National University, Zakarpatskyi State University and Ferenc Rákóczi II Transcarpathian Hungarian Institute have considerable scientific basis in this field.

Slovakia

Stakeholders with local interest and authority: the local authorities – 2 rural settlements

Stakeholders with regional interest and authority: Municipal office in Trebišov, District Office in Trebišov, The Head Office of the Košice Self-government Region and other institutions and NGOs with specific domains of activity: water, emergency situations, human and environment protection, tourism.

Stakeholders with national interest and/or authority: Ministry of Environment, Ministry of Agriculture and Rural Development, Ministry of Transport, Construction and Regional

Development, Ministry of Economy; also, institutions, agencies and NGOs with specific domains of activity: water, tourism, foreign investments.

Hungary

In Hungary the most interested and influential among the **state organizations of national level** is the Ministry of Rural Development. It is responsible for affairs related to rural development, water management and environmental protection and the agricultural economy. The Ministry's main goals are the sustainable management of natural resources, diversity of rural land use, rural development. The Ministry for National Economy as the responsible ministry for tourism development is also a national level stakeholder in case of the pilot project.

The **stakeholders with regional interest** are the regional and county development councils and agencies, the regional Environmantal and Water Directorates and Authorities and the affected National Park Directorates (Bükk, Hortobágy, Kiskunság, Körös-Maros)

The most important **local level stakeholder and authority are** the municipalities along the river, the numerous local environmental NGOs, the local fishing associations and tourism enterprises.

Serbia

Stakeholders with local interest and authority: municipalities and tourism organizations.

Stakeholders with regional interest and authority: Urban and spatial planning institute of Vojvodina, Provincial Secretariat for Interregional Cooperation and Local Self-Government, Public Water Management Company, Assembly of the Autonomous Province of Vojvodina.

Stakeholders with national interest and/or authority: Republic Agency for Spatial Planning

Transportation

Transportation networks consist in road, railway, water and air infrastructure, depending on context. Generally, the main roads cross Tisa corridor than running along the river. There is a national road and also a railway of national importance in Ukraine and Romania that run along Tisa; apart these, there are local roads that connect settlements along the river. The transportation network is considered to be insufficiently developed in order to assure good territorial connections inside the corridor and with the other territories inside TICAD. According to the proposed transportation infrastructure, it can be noticed that territorial connections are planned to be improved through solutions that assure less time between departure and destination: highspeed roads and railways, better connections with airports.

Public roads in the studied area are mainly secondary roads. Except for Ukraine where there is a national road along most part of the PiP3 territory, there are only short sectors of main roads crossing the settlements, sometimes even along Tisa.

From the perspective of navigability, the River Tisa is an unregulated river that is unique in Europe in terms of its natural state. This is the very reason why it attracts so much attention from domestic as well as foreign navigators. The three branches of passenger traffic are rowing tourism, motor-boat tourism and large passenger boat traffic.

In Hungary, River Tisa, because of its length and position is considered to be an ecological corridor. By this mean it draws a lot of attentions from the Public Authorities. **Tisa's Hungarian catchment area is affected by various types of environmental load generated by different types of transport:**

- **ships and ferries pollute the water and cause turbulence**
- **port infrastructure disturbs the living environment and generates local peaks of water and air pollution**
- **traffic crossing the river disrupts not only the ecological corridor but also the landscape**
- **traffic running parallel with the river causes air and noise pollution, disturbing the natural environment**

Whether it runs parallel or transversely to the ecological corridor, traffic inevitably generates environmental loads. All elements of traffic have an impact on the river from ships navigating parallel to the river course through public roads, railways and bicycle paths running along the length of the river all the way to bridges and ferries crossing it transversely.

Despite all the above, transport, for obvious reasons, cannot be banned from this area. However, it is necessary to create the appropriate balance and to minimize all unwelcome impact.

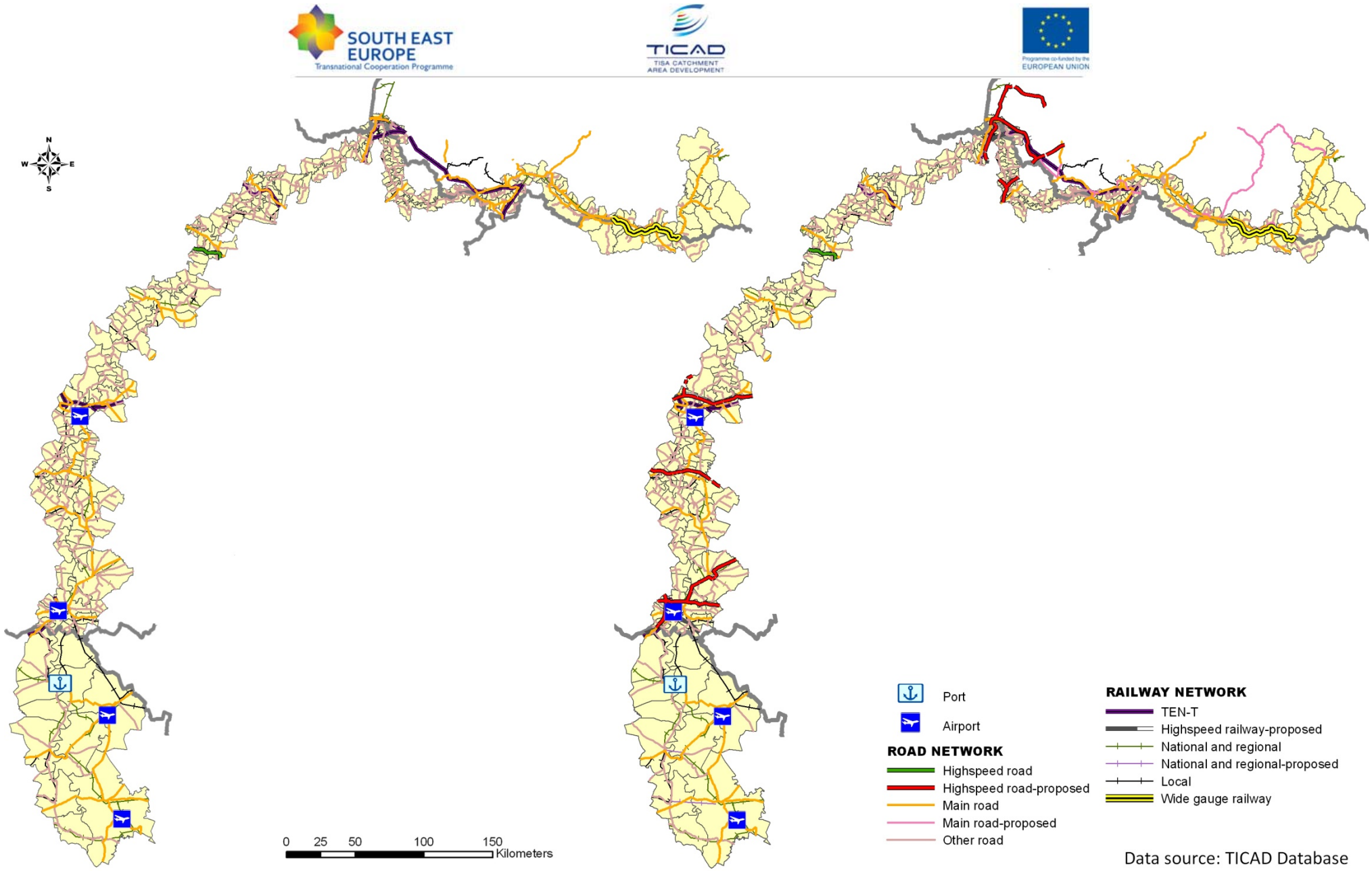


Figure 3. **Transportation network along Tisa Corridor, *existing – proposal***

- **Road transportation**

Romania

There are 2 national roads crossing the PiP3 Romanian area: national road 18 (Baia Mare – Iacobeni) which runs through Sighetu Marmației, Rona de Jos and Rona de Sus and national road 19 (Oradea – Satu Mare – Sighetu Marmației) which runs through Remeți, Săpânța, Câmpulung la Tisa, Sarasău, Sighetu Marmației. Bistra is the only settlement not crossed by a national road.
In Romania, along Tisa's catchment area, the communication routes are characterized by a low density (27.3km/100sqkm, below the national average which is of 34km/100sqkm) and uneven development of the different means of transportation and also lack of interoperability.
Access to Transportation Corridor IV (west-european) is difficult and limited by the reduced capacity and low quality of certain elements of infrastructure, being unable to assure a totally free movement of goods and persons, situation that leads to diminishing the international passangers and cargo traffic that goes through Romania.

Ukraine

In Ukraine, along mostly the whole target area, there is a **main road** of national importance (H09) which plays a key role in connection between Ivano-Frankivsk and Uzhorod. The road H09 has been build along Tisa River channel and repeatedly crosses the river. **Local roads** are better developed on plain and in mountainous areas there are mostly soil roads which become hardly passable after heavy rains or in spring when snow is melting.

Slovakia

In the Slovakian part of the project, there are only 3rd class roads and the road intensity/density (only source and target) is low. These roads are connected with the major road network by higher class roads:

- I/79 border crossing Čierna/Ukrajina (inactive – prepared) – Kráľovský Chlmec – Slovenské Nové Mesto (border crossing SK/HU – active for all means of transport) – Trebišov – I/50 (in the future D1)
- II/555 Kráľovský Chlmec – Michalovce (I/50 and in the future D1).

Hungary

The public roads running parallel to the River Tisa are mostly secondary roads; main roads only run along the river at short lengths. The settlements located along the bank of the River Tisa are mostly connected by paved roads on both sides of the river; however, secondary road links are missing between the pairs of settlements Komor – Szabolcsveresmart, Tisakarád – Tisacsermely, Györgytarló – Tisakarád, Zalkod – Tokaj, Kesznyéten – Sajószöged, Tisakeszi – Ároktő, Négyes – Poroszló, Kisköre – Tisasüly and Fegyvernek – Tisapüspöki.

Typically, traffic on the roads running along the river is limited; any significant traffic is only seen on the main roads running parallel to the River Tisa between Szolnok and Martfű and on the section between Algyő and Szeged (>10,000 units per day).

The interconnections between the settlements on opposite sides of the river, and in general, the accessibility of those settlements are greatly affected by the availability of means of transport across the river.

Along the River Tisa, public road bridges, that connect settlements on opposite sides of the river, are distributed at an average distance of 45 rkm from one another; however, the actual distance between any two neighbouring bridges ranges between as little as 15rkm and as much as 87rkm, which in fact means distances between 6km and 73km on road.

Available public road bridges:

- along the upper section of the Tisa: at Tisabecs, Tivadar, Vásárosnamény, Záhony, Cigánd and Tokaj
- along the middle section: at Polgár, Tisafüred, Kisköre and Szolnok
- along the lower Tisa: at Tisaug, Szentes, Algyő and Szeged

The planned development of the high-speed public road network will require a number of new river crossing points. It is expected that new bridges will be constructed at Vásárosnamény, Szolnok, Záhony, and Tisaug. However, at Záhony and Tisaug, the new bridges will be built close enough to existing bridges to only add to existing environmental impact rather than creating new disruption.

Serbia

Several **main roads** are crossing the area:

- The motorway E- 75 is partly crossing from Subotica to the national border.
- The sections of greater importance are on the following roads:
  - DP-3 (section Srbobran – Becej – Novi Becej – Novo Milosevo)
  - DP-7 (section Novi Sad – Zrenjanin – Zitiste – Nova Crnja – Srpska Crnja)
  - DP-7.1 (Zrenjanin – Secanj)
  - DP-24 (section Senta – Coka – Kikinda – Melenci – Zrenjanin – Ecka – Kovacica)
  - DP-24.1 (section Ecka – Perlez – Centa)

Along the river Tisa there are mostly secondary (regional) roads. Those are paved roads and they are all in service.

There are 18 bridges: five of them across the Tisa River (3 road bridges and 2 road-railway bridges). There is evident lack of bridges in the area.

- **Railway**

Romania

Five of the nine Romanian settlements included in the PiP3 area are connected to the railway network. Along Câmpulung la Tisa – Sarasău – Sighetu Marmației and going to Valea Vişeului, there is simple, not electrified wide gauge rail. From Valea Vişeului (not included in PiP3 area) to Bistra, the rail is normal.

The completion of the railway's rehabilitation will increase the speed of passenger trains and reduce the duration, thereby achieving reduced maintenance costs of infrastructure; it will also help adding more efficiency in connecting with other regions of the country, due to national programme of railway design and infrastructure, in which this area is integrated.
Rail density is low – 34,1km/1000sqkm, below the national average which is of 47,9km/1000sqkm.

Creating an integrated system of local train and bus will facilitate access to and from the railway to road network.

Ukraine

Railway transportation is also present; parallel to the main road H09, there is also a railway of national importance. It crosses national border to Hungary near Dilove village and returns back to Ukraine near Teresva.

The recent Trans-European railway crosses the target area within Uzhorodskyi, Berehivskyi and Vynohradivskyi Regions.

Slovakia

The main railway line passes through the PiP3 area, which is integrated in the trans-European transport network TEN-T – Corridor 5 and is integrated in the Programme of Modernization to 2020. The increase of railway line speed to 160km/h is proposed. From the aspect of transportation as well as economic activities the railway border crossing Čierna nad Tisou is very important, although currently it is not sufficiently used.

There is a transfer station between Ukraine (broad gauge) and Slovakia (standard gauge).

Similarly, in the area there is a terminal of combined transport Dobrá, near Čierna nad Tisou, which is run by the railway company Cargo a.s. – currently its capacity is not sufficiently used. Its completion and modernization according to the parameters of the AGTC Agreement is proposed.

Hungary

Railways run parallel to the river only along three relatively short sections. The single-track, non-electrified secondary railway lines between the pairs of settlements Vásárosnamény – Záhony, Szolnok – Tisaalpár, and Szelevény – Kunszentmárton are used by four to eight pairs of trains a day.

With the exception of the one at Szolnok, all railway bridges across the River Tisa were built right next to public road bridges. Consequently, they disrupt the ecological corridor within the same stretch of land as the public road they run parallel with (Main Road 38 at Tokaj, Main Road 33 at Tisafüred, Main Road 451 Csongrád, and Main Road 47 at Algyő, while the railway bridge at Kisköre runs parallel with a bridge along a secondary road).
Railway bridges are only expected to be built when the high-speed railway line arrives. This will cross the River Tisa at two points: at Zsurk on the Hungarian–Ukrainian border and at Szolnok along the bridge of the future high-speed road M4.

Serbia

The following railway lines are operating in target area: Subotica – Horgos – border: Roszke, Pancevo glavna stanica – Zrenjanin – Kikinda – border: Jimbolia, (Novo) Banatsko Milosevo – Senta – Subotica, Novi Sad – Rasputnica Sajlovo – Rimski Sancevi – Orlovat.

There are 2 road-railway bridges across the Tisa River.

- **Water transportation**

Ukraine *and* ***Romania*** – not the case. Navigation is not suitable on these sectors of Tisa River, as it is too close to its springs and passes through mountainous areas.

Slovakia

Although there is no navigable watercourse directly in the target area, the Conception for the Development of Water Transportation of the Slovak Republic is considering navigation of East Slovakian rivers the Laborec, the Latorica and the Bodrog especially for freight transport and thus continuing navigation of the Tisa River in Hungary. This project will also have a positive impact on the target area especially economically.

Hungary

Currently, the River Tisa is not an international waterway; as a result, only Serbian and Hungarian ships may cross the border between the two countries freely. Within the Hungarian section of the River Tisa, only the short stretch between Szeged and the border is classified as an international waterway; the sections north of Szeged are only suitable for navigation by passenger boats. Consequently, the port of Szeged is the only port of national importance along the Hungarian section of the River Tisa.

	Section (from rkm to rkm)	Classification of the waterway
From the mouth of the River Szamos to Komoró	685-612	I
From Komoró to Tokaj	612-544	III
From Tokaj to Kisköre	544-403	III
From Kisköre to Szeged	403-254	II
From Szeged to the border	254-160	IV

Table 3. Sections of Tisa River in Hungary

Ports on the River Tisa are available at Tisapalkonya, Tisabábolna, Tisafüred, Kisköre, Szolnok, Nagykörű, Tisaroff, Tisakécske, Szentes, Csanytelek, Mindszent, Algyő, and Szeged; marinas for small ships and boats are available at Tisabercel, Tokaj, Tisafüred, Tisaörvény, Tisaroff, Szolnok, and Tisaug on the River Tisa and at Poroszló, Újlőrincfalva, Sarud, and Abádszalók at Lake Tisa.

No substantial changes have been seen in freight shipping on the River Tisa over the past few years. The volume of internal freight shipping has remained at a level under the historical peak of 0.5 million tons per year.

Ferries – which are more frequently distributed between bridges along the northern section of the River Tisa – do not really represent a viable alternative to bridges partly because of their seasonal operation and partly because of their limited capacity; however, they represent a greater degree of disturbance to nature than bridges.
There is a total of 15 ferry crossing points along the Hungarian section of the River Tisa.

- along the Upper Tisa: Tisaadony–Aranyosapáti, Lónya–Tisamogyorós, Zemlénagárd–Tuzsér, Révleányvár–Fényeslitke and Gávavencsellő–Kenézlő
- along the middle section: Tisalök–Tisatardos, Tisadob–Tisalúc, Ároktő–Tisacsege, Tisadorogma–Egyek, Tisaroff–Tisasüly and Nagykörű–Fegyvernek
- along the Lower Tisa: Vezseny–Martfű, Tisabög–Nagyrév, Csongrád and Baks–Mindszent

Serbia

There are two waterways within the target area: Tisa River and the Canal system Danube – Tisa – Danube. Tisa is navigable through the entire territory of Serbia, in length of 160km. In the present it has a status of inter-state waterway and it belongs to the navigable class IV. Canal System Danube – Tisa – Danube (DTD) is a multipurpose hydraulic system. It provides 120km for navigation class IV. DTD system is currently in a very poor condition due to the extream pollution and uncontrolled sedimentation.
On the Tisa River one international port is situated in the city of Senta.

- **Air transportation**

Travelling by plane is a fast way to reach distant places, but it also includes reaching the airport by other means of transportation; so, from the point of view of the ecological corridor, an airport is not a must have.

Romania
There are no airports in the studied area or plans to build one. The closest airports are in Baia Mare (Maramureş county) and Satu Mare (Satu Mare county).

Ukraine
There are no airports in the studied area. The closest airports are in Uzhorod and Mukacheve.

Slovakia
There are no airports in the studied area. The closest airport is in Uzhorod (Ukraine), but the closest Slovakian important airport is in Kosice.

Hungary
There are two airports in the Hungarian PiP3 area: at Szeged (national airport) and at Szolnok (for both civil and military use); there are other regional airports close to the studied area.

Serbia
Air transport is organized via 2 special airports: Zrenjanin (Ecka) and Kikinda (Drakslerov salas), for civil purposes other than transportation (sport, agriculture, training, tourism).

- **Cross border points**

For the moment[4], only Romania, Hungary and Slovakia are part of EU, while only Hungary and Slovakia are part of the Schengen area[5].

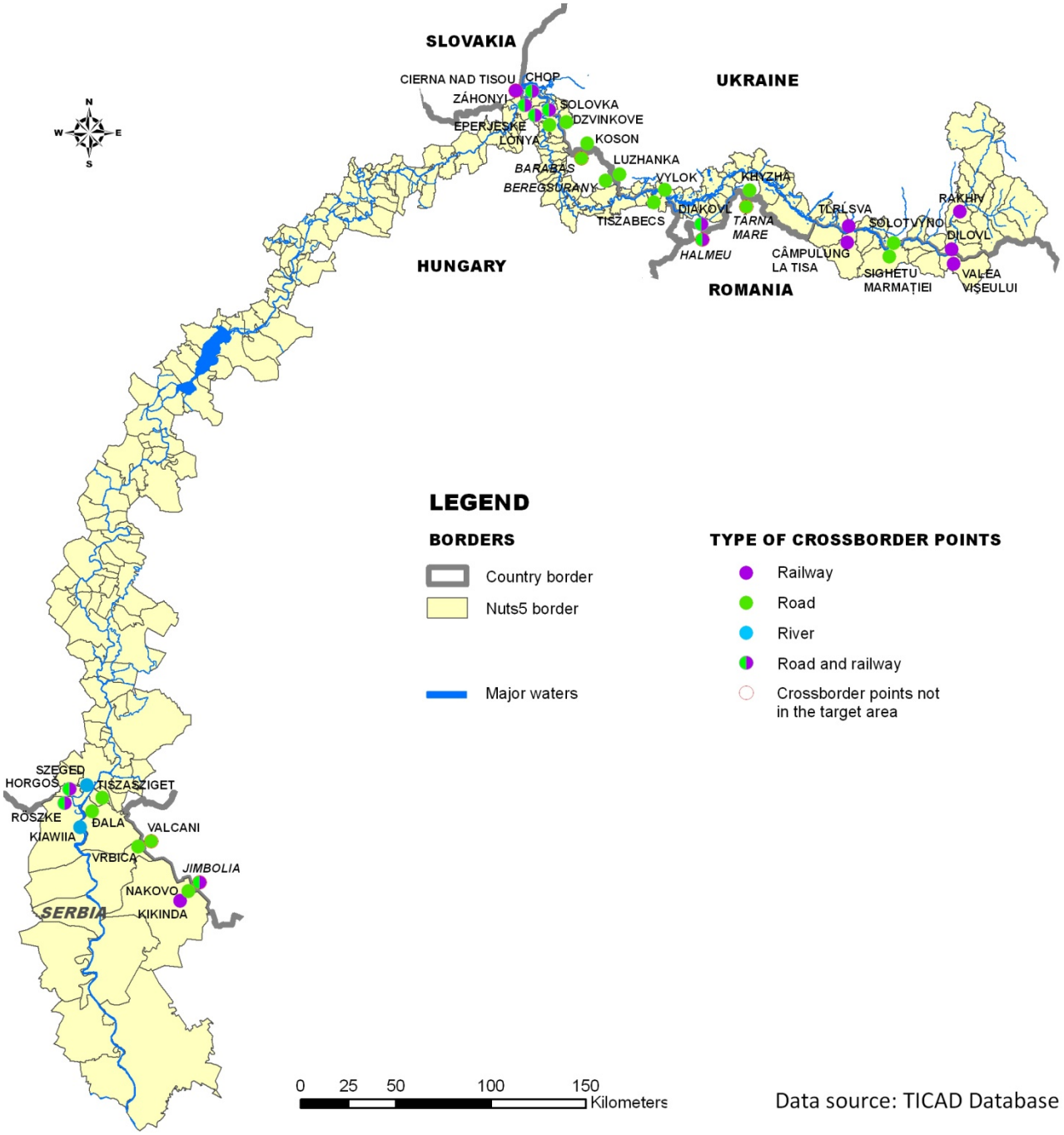


Figure 4. Crossborder points across PiP3 area

[4] February 2012

[5] Under the Schengen agreement, transiting from one country to another within the Schengen area is done without border controls. In fact, the Schengen visa makes it possible to visit all the countries in the Schengen area and to cross internal borders without further formalities. (*http://www.axa-schengen.com/en/schengen-countries*)

Romania

There is one road border crossing point – in Sighetu Marmației and two railway border crossing point in Câmpulung la Tisa and Bistra (Valea Vişeului).

In order to increase accessibility in the border area, a new connection road is planned to be realized between National Road 18 and the left bank of Tisa; also, a new bridge (4,5km upstream of the existing bridge) and new border crossing points (one building on each side of the border Romania – Ukraine) are planned. The investment is planned according to crossborder cooperation programmes.

Ukraine

A distinctive competence of the target area in Ukraine is that as Tisa River flows mainly along state border, there are cross border points in the target area.

The main centre of border crossing both for Slovakia and Hungary is an area around Chop city with developed transport infrastructure for the purpose of border crossing both passenger and cargo and both motor and railway which gives the opportunity and possibility to use these border locations in involving international investments to transport network development in the target area.

Besides Chop and neighboring Solovka there are border crossing points in Vylok (Vynohradivskyi Region) – for motor crossing by passengers to or from Hungary; in Dyakove (Vynohradivskyi Region) – for motor crossing by passengers and cargo moving both by motor and railway transport to or from Romania; in Teresva and Dilove both passenger and cargo, and in Rakhiv – only cargo by railway to or from Romania. Mostly all of the border crossing points are of international category. Only in Dyakove passengers crossing is only of local category and also Teresva and Dilove both passenger and cargo are of local category. There are no cross-border points of international category for passenger passing to the East from urban-type settlement Vylok within the target area.

Slovakia

Due to geographical layout, there are border points with two countries that are also part of the project: Hungary and Ukraine.

Road border crossing to Ukraine is made by the road I/79 Čierna – Solomonovo, which is a prepared road border crossing for freight international transport TIR with the presumed use of terminal of combined transportation (TCT) Dobrá, with uploading and downloading of trucks to the railway – it is necessary to build a road bypass around the village Čierna. This border crossing allows connection of border crossing to Ukraine with the border crossing to Hungary (Slovenské Nové Mesto). The disadvantage of the border crossing for haulage transport is insufficient bearing capacity of access roads I/79 and II/555.

The border crossing for personal transport which opened in 1993 for local border traffic, is currently out of service. The nearest current border crossing is on the road I/50 Vyšné Nemecké – Užhorod. It is an international crossing for unlimited crossing for passenger and freight transport.

Road border crossing to Hungary is unavailable in the target area. The nearest border crossing for unlimited crossing for passenger and freight transport is on the road I/79 Slovenské Nové Mesto – Sátoraljaújhely.

In the target area and in the contact territory there are proposed border crossings for local crossing, so called local border traffic. These will be established and financed by the funds of the authorities of border regions of the neighbouring countries, namely:

- Veľké Trakany – Zemplénagárd. Connection of the villages will create conditions for revival of cooperation in the region
- Bieľ – Dámóc, with the possibility to access the terminal of combined transportation Dobrá.

Hungary

On the PiP3 Hungarian territory there are border crossing points with Ukraine and Serbia:

- Tiszabecs–Vilok (HU-UA)
- Lónya–Zvonkoje (HU-UA)
- Záhony–Csop (HU-UA)
- Röszke–Horgos (HU-SRB)
- Tiszasziget–Djala (HU-SRB)

There are two railway border crossings (Záhony, Eperjeske) to Ukraine, and one railway (Röszke) and one waterway (Szeged) border crossings to Serbia.

Serbia

There are seven border crossings in the target area: one river, two railway and four road border crossings provide five international and two local border crossings.

- **Bicycle routes**

This is one green option to go through the ecological corridor of Tisa as a tourist.

Slovakia

The following cycle routes pass through the villages Malé Trakany and Veľké Trakany:

- Big round cross-border route passing through the village Veľké Trakany from the village Biel and then continuing along the left dam of the Old Tisa to the village Zemplénagárd in Hungary.
- Big round cultural and historic route passing through the villages Malé Trakany and Veľké Trakany from the town Čierna nad Tisou and then continuing to the village Biel.
- Big natural history round route passing through the villages Malé Trakany and Veľké Trakany from the town Čierna nad Tisou and then continuing to the village Biel.
- Small round route C: Kráľovský Chlmec – Dobrá – Biel – Čierna nad Tisou – Malé Trakany – Veľké Trakany – Biel (1st class and 2nd class roads) – Dobrá – Pribeník (lane) – Kráľovský Chlmec (3rd class road).

Hungary – The bicycle routes running parallel to the river are mostly bicycle paths constructed on top of the embankments of the River Tisa. Dedicated paved bicycle lanes are currently only available for bikers along main roads with significant motor vehicle traffic, and they are limited to those sections of these roads that run within city limits. These serve local transport needs and protect the health and safety of cyclists. Recently, bicycle tourism has gained in popularity thanks to the launching of projects aiming at the construction of dedicated bicycle paths for tourism (such as, for example, EuroVelo 11.).

	Strenghts	Weaknesses	Opportunities	Threats
Romania	- Position of the region: near the country border; - Planning railways rehabilitation on a national scale;	- Insufficient capacity to transport passengers and cargo; - Low level of efficiency and traffic safety; - Density of road and rail network below the average in the country; - Low degree of modernization for road and railway networks; - Low accessibility of the area;	- Measures on local, regional and national scale for the modernization of road infrastructure and rehabilitation of existing roads; - Possibility of accessing European funding programs and also national programs;	- Lack of coherent policies and strategies for infrastructure development in the area; - Slow rhythm of modernization of road infrastructure; - Not mentioning the deadline for the construction of motorways, expressways and new railways; - Lack of funds and investments;
Ukraine	- Transit transportation routes passing through the target area; - Presence of a network of cross border points.	- Geotechnical conditions of the territory are difficult for transport network development; - Insufficient throughput of cross border points; - Lack of cross-border points of international category for passenger passing in eastern part of the target area.	- Possibility to use near border location to involve international investments to transport network development;	- High hazard of roads and railways destroying by floods, landslides, mud-flows etc.
Slovakia	- Part of the Schengen area; - Transit transportation routes passing through the target area; - Bicycle routes	- The border crossing for personal transport which opened in 1993 for local border traffic, is currently out of service;	- Proposed border crossings for local crossing; - Developing navigability on the tributaries of Tisa will have positive impact in the target area;	- Lack of funds and investments; - Peripheral position of area within Slovak Republic and EU as well.
Hungary	- Part of the Schengen area; - Bicycle routes; - Tisa is navigable on the Hungarian PiP3 territory; - Existence of two airports	- Main roads and railway lines only run along the river at short lengths - Poor condition of the secondary road system - Rare river crossing opportunities	- New highspeed roads crossing the area are proposed; - Projects aiming at the construction of dedicated bicycle paths for tourism;	- Is affected by various types of environmental load generated by different types of transport -Fragmantation of habitats caused by infrastructure development
Serbia	- Dense transportation network; - Presence of cross border points; - Proximity of the international highway; - Good settlement network.	- Poorly maintained transportation network; - Bad public transportation offer; - Degraded railway network.	- Possibility of better exploitation of roads, railways, local airports and waterways.	- Unsustainable transportation structure

Table 4. SWOT analysis on Transportation in PiP3 area

Natural Risks

- **The typology of natural risks identified in the Pilot target area**

Floods are the common threat affecting the studied area, having a high impact upon the livelihoods and imply large scale environmental changes. They have a historical occurrence, resulting in hydro-technical works which started in the 19th century. They are amplified by natural specific conditions like the groundwater level, topography and soil permeability.

Flooding is the most influential natural hazard within Ukrainian part of the target area. The hazardous areas are mostly foothills and plain, but also the territories along Tisa River channel in mountainous areas which are strongly damaged when flood occurs.

Floods have a very high frequency also in the *Romanian* sector of upper Tisa, causing important damages almost every year[6]. The phenomenon takes place especially along the floodplains of the main rivers, including Tisa, but also on the slopes, along their tributaries.

Even though the Tisa River in *Slovakia* is not very long, the flood situations significantly affect floods in Ukraine and Hungary. The flood wave of the Tisa causes the backwater of the Bodrog River.

In *Hungary*, 14% of the Pilot target area is flood prone area and 67% is endangered by flood risk. There are 1 or 2 flash floods coming down on the Tisa yearly; however, major floods are expected only once every 5 or 6 years.

In *Serbia* there are 115000 hectares included in the floodrisk areas, out of which approximately 12000 hectares of floodrisk areas belong to Begej River and 3500 hectares belongs to Danube River.

Excess water is intricately related to free flow of the water from rain, snow or underground sources. In the *Hungarian* Tisa Valley, there are almost 200-250 thousand hectares of agricultural land, which is flooded by excess waters more frequently than every five years, so that these lands should not be worked in the current manner. Areas exposed to excess waters in the Great Plain: the surroundings of the Upper Tisa (Bereg, area between the Tisa and the Szamos, area between the Szamos and the Kraszna, Rétköz, Bodrogköz, Taktaköz), the area near Hortobágy, a large part of the Jászság and Nagykunság, the area of the Körös Rivers, the valley of the Lower Tisa. Special attention should be paid to the changes in land use, which can lead to an increase, or eventually reduce the exposure to excess waters. For example, exposure to excess waters is increased in the surroundings of river dams, reservoirs and fishponds, regularly irrigated areas, as a result of improper agro-technologies (such as failing to perform deep plowing), by paving or constructing on the surrounding areas, and as a result of drainage of waste waters or other used waters. In the interior of many settlements in the Great Plain, the excess water load from waste water drainage resulted in a significant elevation of ground waters, which also contributed to the floods affecting the interior of the settlements.

Landslides have a considerable extend within the area of Rakhivskyi, Tyachivskyi and Hustskyi Regions in *Ukraine*. Also a hazard of avalanches and mudflows is high in mountainous areas of Rakhivskyi Region.

On the *Romanian* territory of Tisa ecological corridor, 18 areas which are exposed to landslide risk have been identified. They cover an area of 981kmp and have a relatively homogeneous distribution. Their occurrence is caused by human intervention, but also due

[6] Şerban et al., 2010

to morphometric conditions. The highest number of landslides is identified on the administrative territory of Sighetu Marmației, Rona de Sus, Săsar and Remeți.

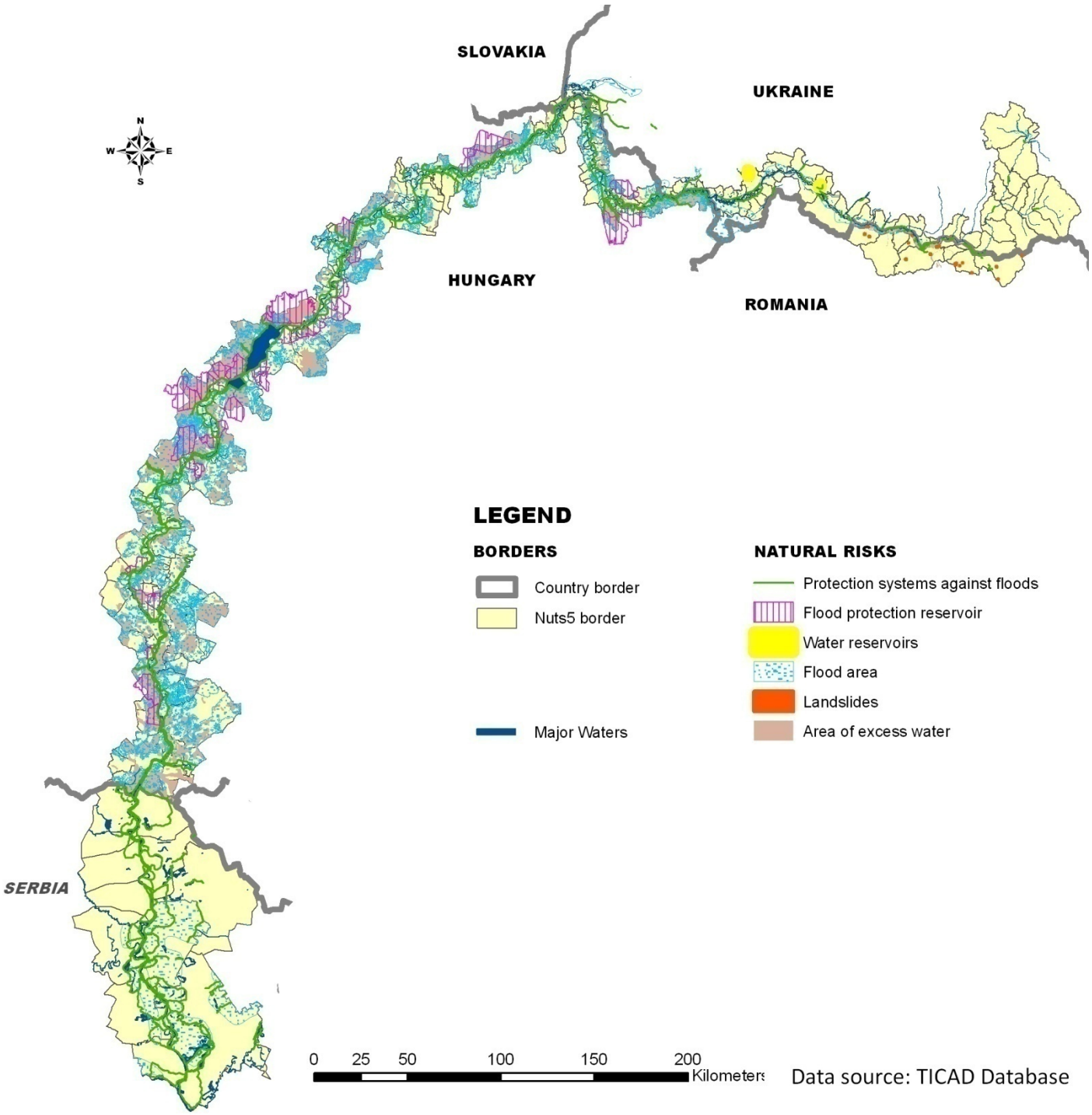


Figure 5. Natural risks inside PiP3 area

- **Natural factors which increase the risk probability**

The level of groundwater in Uzhorodskyi, Berehivskyi and Vynohradivskyi *Ukrainian* Regions is a clear example of natural determinants acting on flood incidence.

In *Romania*, floods are caused by the **high amounts of precipitation** falling annually in this area (the massive exposure of slopes to westerly air masses, loaded with high moisture) and the **high inclination of slopes**, which enables a fast surface drainage.

In *Slovakia*, the right-handed dam of the Tisa River in the section from the state border with Hungary to the state border with Ukraine is at present dimensioned at flow of Q100-year water. Its floodplain is agriculturally utilized. But some parts of the flood plain have been overgrown with ground woods. It has caused the increase of hydraulic resistance resulting in decrease of water rate in the floodplain.

The upper stream of the tributaries has **rapid flow** of water: within 1 or 2 days after rapid snow melt or bigger rainfalls, floods appear on the *Hungarian* sector of the river, which can cause flushes of several meters in a short time. In this respect, there are especially dangerous the Upper Tisa and its tributaries, because water level can rise by 8 to 10m at the borders within 28 to 36 hours. At the sections close to river mouth, the Tisa River and its tributaries can have a significant influence on each other's water flow. The shape of the river basin causes the flash floods on the tributaries to reach rapidly the Tisa River and these floods usually reach their peaks sooner than the flashes formed at the upper stream of the Tisa. The consequences of bigger floods on the Tisa River are always felt on the lower streams of the tributaries, or sometimes even on their upper sections. For example, during bigger floods Tisa can gather back into the Körös over a distance of 100km. However, the floods flowing down on the tributaries considerably reduce the speed of flash floods on the Tisa, and increase its level and duration, especially on the section between Szolnok and the south border of the country.

- **Antropic factors acting upon the risk probability:**

1) *Financial resources* allocated to prevent and to address the effects of natural risks are insufficient: projects don`t benefit of proper funding, despite the important expenditure to counteract the flood effects.

2) *Educational issues* are related to the lack of proper reaction of the communities facing natural risks.

3) *Political reaction* impacts of the cooperation efficiency between authorities in implementing projects; Romania is deficient in a serious and efficient cooperation with the Ukrainian authorities, in order to achieve large hydrotechnical projects, meant to solve these problems in a sustainable manner.

4) *Administrative passivity* regarding the abandonment of flood protection works resulted in the insufficiency of reservoirs and floodable enclosures that could, in Serbia there is an absence of accident situation protocols.

- **Measures already implemented**

In **Romania**, the embankments ensure partial protection against floods at the level of the following settlements: Valea Vişeului, Lunca la Tisa, Bocicoiu Mare, Crăciuneşti, Sighetu Marmației, Sarasău and Câmpulung La Tisa. However, in the case of floods at levels which reach 1% probability, the settlements situated along the corridors of Tisa, Iza and partly Vişeu may be more or less affected by floods. This is possible as a consequence of

embankment overflow or water inflow in lower areas, at confluences and bridges fit with barriers.

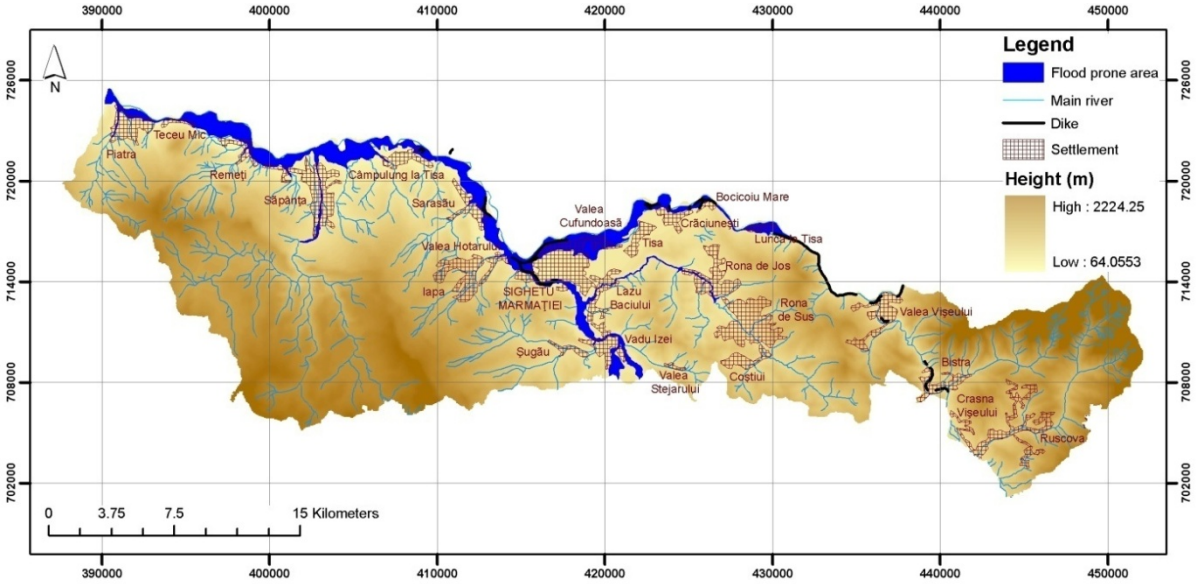


Figure 6. **Flood protection hydrotechnical systems and floodable areas within Tisa ecological corridor**

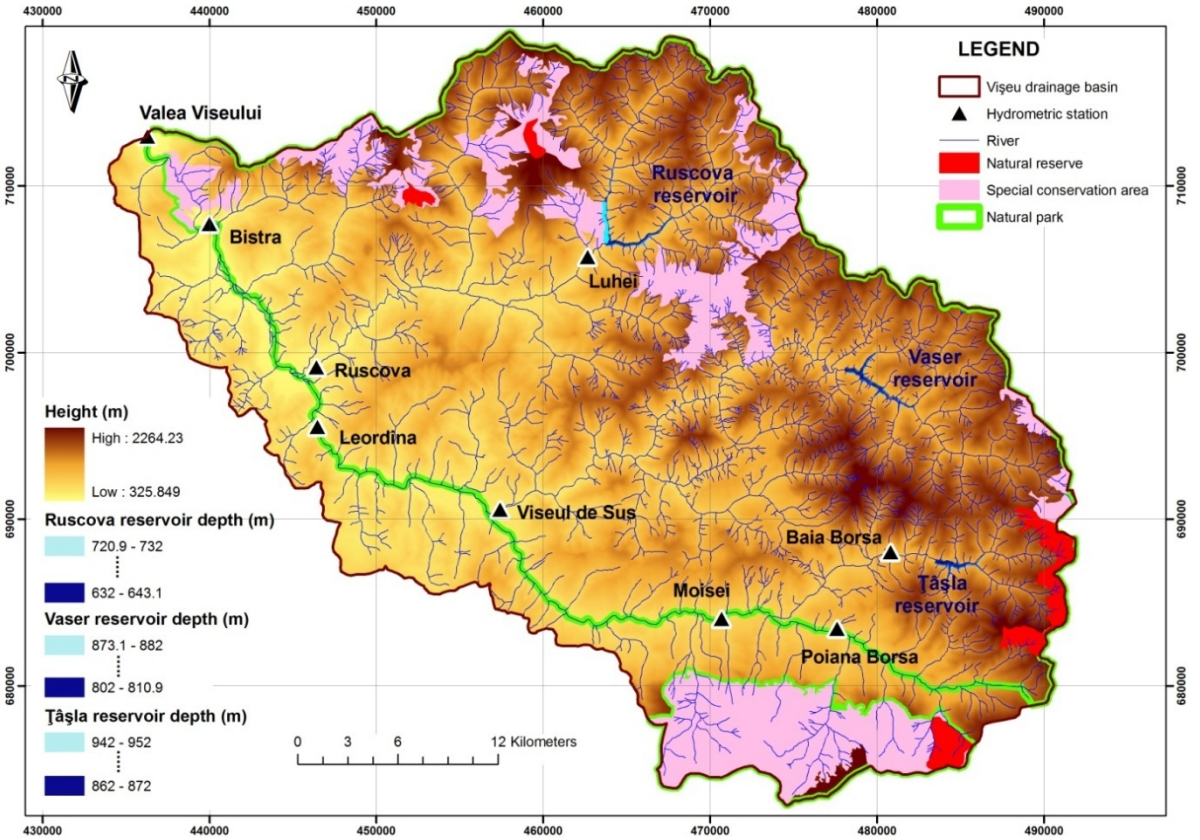


Figure 7. **Reservoirs proposed for the management of floods and high waters in Vişeu catchment area, without an impact on the protected areas *(after Şerban et al., 2010)***

Slovakia presently develops the "Veľké Trakany – Tisa Dam Reconstruction" Project. This project was developed as an investment on the base of the performed reconstruction of the Tisa dams in Ukraine with the capacity of Q200-year waters. The construction should be realized in the villages Veľké Trakany and Malé Trakany. The construction will include the increase of the crest of the right-handed dam of the Tisa River in Slovakia in the section with the length of 6km from the state border with Hungary to the state border with Ukraine. It is supposed to increase the dam crest on the level of the dam crest in the neighboring countries. To ensure the flood protection in Slovakia it is necessary to reconstruct the dam of the Tisa River on the border section Hungary – Ukraine.

Hungary's flood protection system consists primarily of embankments and lines of defense against flood built along the rivers. Two third of the primary lines of defense, totaling approximately 4,000km, were built in the Tisa Valley. The Improved Vásárhelyi Plan, launched in September 2003 by a Government Decision and currently under implementation, establishes that flood protection safety of the Tisa Valley should be further increased by reducing the flood water levels, by the improvement of the water delivery capacity of the main river bed on the one hand and by establishing a flood-diminishing storage system in the domestic flood area in such a manner that the reduction of threatening floods is accompanied by the reactivation of the flood plain through regulated water drainage. Flood plain interventions are primarily implemented on the section of Tisa between Kisköre and the south border of the country.

Another important aspect of this investment relates to the establishment of flood reduction reservoirs (table 5). During planning, 30 sites suitable for reservoirs have been inspected. The 10-14 reservoirs selected can ensure the necessary flood water retention capacity of 1.5 billion m^3, which will reduce water levels by approximately 1 m along the entire course of the Tisa River in case of floods exceeding the significant levels. These reservoirs are expected to be used for flood protection purposes once every 30 to 40 years.

The area needed for these reservoirs is of 50,000 to 75,000 hectares. These reservoirs will be limited by natural high riverbanks in a smaller portion, or artificial embankments in a more significant portion. The flood reduction works will allow the collection of flash flood waters, which exceeds the level of riverbanks, and thus, they will also allow for landscape management or water replacement for ecological purposes. Two reservoirs were built (Cigánd, Tiszaroffi), and three reservoirs (Szamos-Kraszna, Nagykunság, and Hanyi-Tiszasüly) have already obtained a valid water license.

Name	area km^2	volume mm^3	planned implementation
Nagykunsági	44.0	100.00	2011-2020
Hortobágy középső	61.8	135.50	2030-2050
Tiszanánai	37.5	72.00	2020-2030
Tisza-Köröszugi	68.0	160.00	2030-2050
Cserőközi	19.7	40.00	2030-2050
Szegedi	61.0	187.00	2020-2030
Hanyi-Tisasűlyi	57.0	132.00	2011-2020
Hanyi-Jászsági	60.0	113.00	2020-2030
Inérháti	42.0	100.00	2020-2030
Szamos-Kraszna közi	58.4	100.00	2011-2020

Szamosközi	54.5	102.00	2020-2030
Dél-Borsodi	120.0	150.00	2020-2030
Tiszacsegei	52.0	105.00	2030-2050
Cigándi	65.0	83.00	built
Tiszaroffi	24.6	74.00	built
Tiszacsegei-felső	21.0	33.50	2030-2050
Jászkiséri	26.1	22.70	2020-2030
Csanyteleki	10.6	13.80	2020-2030
Atkai	23.0	30.00	2030-2050
Cserőközi-alsó	16.0	26.00	2030-2050
Nagykörüi	15.7	20.00	2020-2030
Tiszakarádi	27.1	47.10	2020-2030
Tiszagyulaházai	20.0	31.00	2030-2050
Besenyszögi	59.6	76.00	2030-2050
Tiszanánai-alsó	22.6	30.10	2030-2050
Gergelyiugornyai	33.0	59.00	2030-2050
Tiszakécskei	19.0	23.00	2030-2050
Tiszapüspöki	24.4	31.80	2030-2050
Total	**1143.6**	**2097.50**	

Table5. Vásárhelyi Plan reservoirs

Since the middle of the 19th century, a series of excess water drainage systems (table 6) were built. A large part of the extensive excess water drainage system (approximately 40000km) consists of artificial channels.

Table 6. Excess water drainage subsystems; Source: ICPDR: Evaluation of the situation in the Tisa River Basin

Number of excess water drainage subsystems	Total area covered by these subsystems (km^2)	Length of channels (km)	Average flow ($l/s/km^2$)
64	33765	37083	31

Table 6. Excess water drainage subsystems;
Source: ICPDR: Evaluation of the situation in the Tisa River Basin

In **Serbia**, after the disastrous flood caused by overflow of the Danube (1965) and the Tisa (1970) and the immense damages these floods caused, the Executive Council of the Vojvodina Autonomous Province adopted a decision on implementing a uniform system of protection against floods in Vojvodina at the level of 1% of flood flow.

	Strenghts	Weaknesses	Opportunities	Threats
Romania	- Existence of embankments in strategic points; - Mandatory housing insurance;	- Steep slopes, which favors a rapid drainage of surface; - Lack of lakes or floodable areas, both on Tisa and its tributaries; - Local authorities lack of response outside the period of production of floods; - Lack of serious and effective cooperation with neighbour authorities, in order to achieve large-scale hydro projects; - When setting the place for settlements, it wasn't taken into account avoiding the floodplains; - Homogenous distribution of areas affected by landslides.		- Large amount of precipitations falling annually in the area; - Frequent blocking of water courses with residues from households; - Massive deforestation on the slopes; - Excessive use of pastures; - Lack of financial resources allocated to the area, despite the significant costs to remedy the effects of floods;
Ukraine	- Existing flood protection system (protection lines, reservoirs); - Developing flood monitoring system in cooperation with neighbouring Hungary.	- Concentration of settlements along Tisa within flood-prone area; - Run-down meliorative canal network due to the lack of maintenance.	- Expressive sample for elaboration transnational approaches for flood prevention.	- Large amount and heavy character of precipitations.
Slovakia	- Very good flood protection services, enough human resources.	- There are missing declared flood plains, flood hazard maps, flood risk maps; - Approved flood-protection measures are not suitably and enough fast implemented; - Insufficient legislative solution of property ownership.	- Water Framework Directive of the EU; - Flood Protection Directive of the EU.	- Impacts of climate change (droughts, flash floods).
Hungary	- Existing flood protection system (protection lines, reservoirs); - Vásárhelyi plan; - Water retention capacity; - Natural water supply.	- Increasing flood level and duration; - 50% of the pilot target area is endangered by excess water flooding.	- Availability of EU resources; - DIRECTIVE 2007/60/EC on the assessment and management of flood risks (space for the river).	- Increasing impacts of climate changes, growing frequency of extremities.
Serbia	- Almost fully solved drainage of excess inland waters (drainage) (canal network /DTD Hydrosystem); - Existing network of dikes for flood control.	- Run-down meliorative canal network due to the lack of maintenance; - Lack of maintenance on the facilities of DTD HS.	- Regenerating and reconstructing hydro-system facilities.	- Absence of accident situation protocols.

Table7. SWOT analysis on Natural Risks in PiP3 area

Environmental Risks

- **Drivers of environmental risk**

Industrial activity: except the Hungarian and Serbian river sectors, there is a low industrial activity in Tisa corridor. In **Romania**, industry has a minimum impact upon the environment quality, especially after the industrial restructuring and the appearance of more restrictive environmental practices meant to prevent industrial hazardous pollutions like the accidental pollution of Tisa tributary, Vişeu River; the pollution level is low due to the extent of the considered area and the scarcity of industrial units in the proximity of the border, excepting those associated with Sighetu Marmației where eight companies have been identified acting in the following fields: leather tanning and processing, wood processing, paper manufacturing, coking products manufacturing, manufacturing of other non-metallic ore products, manufacturing of machinery, tools and equipments.

In **Hungary**, the industrial centers of the area under study are Tiszaújváros, Szolnok, Szentes, Hódmezővásárhely and Szeged. The number of both industrial enterprises and industrial employees is significantly higher in the cities than in other settlements of the region. Additional centers of a more limited significance include Martfű, Csongrád, Tiszakécske, Törökszentmiklós, and Tiszafüred. Typically, these centers are located along the Lower Tisa. The only industrial centers located along the middle section of the river are Tiszaújváros, Törökszentmiklós, and Tiszafüred. The Hungarian areas along the upper sections of the River Tisa are very poor in industrial activity; the few industrial centers to be mentioned include Vásárosnamény, Záhony, and Tokaj. A number of smaller mining sites are scattered around the area under study. These are operations extracting construction materials (sand, gravel, and clay). Along the Lower Tisa, hydrocarbons (oil and natural gas) are produced.

There are 23 *Seveso* plants within the area under study. Ten of these are hazardous plants with a lower limit value, while 13 are hazardous plants with a higher limit value. Three of them are located along the upper region of the Hungarian section of the River Tisa (in Tiszabezdéd and in Tuzsér), nine along the middle section (in Tiszaújváros, Törökszentmiklós, Szajol, and Szolnok), and 11 are located along the Lower Tisa (in Lakitelek, Szentes, Hódmezővásárhely, and Algyő). As far as their activities are concerned, the most typical are plants related to oil and natural gas extraction and supply (seven in Algyő; two in Lakitelek and Szajol; two in Szentes and Tiszabezdéd).

Additional typical activities are as follows:

- Chemicals wholesale (two plants in Hódmezővásárhely; Törökszentmiklós)
- Production of inorganic chemical substances (Szolnok and Tiszaújváros)
- Production of lead, zinc, and tin (Szolnok)
- Electric power production (Tiszaújváros)
- Production of dyes and pigments (Tiszaújváros)
- Production of raw materials for the plastic industry (Tiszaújváros)
- Warehousing and shipping (Tuzsér)

There are 117 *E-PRTR* plants operating along the River Tisa. 16 of these are located along the Upper Tisa, 41 along the middle section of the river, and 60 in the Lower Tisa region. Most polluting plants are concentrated in cities such as Vásárosnamény (5 plants), Tiszaújváros (11 plants), Szolnok (11 plants), Szentes (9 plants), Hódmezővásárhely (11 plants), and Szeged (15 plants). Based on their core activities, most plants within the region

(48) are involved in large-scale animal husbandry. Additional significant activities are solid waste and sewage treatment (24 plants), the mineral industry (12 plants), the energy sector (11 plants), the chemical industry (7 plants), the food processing industry, and the manufacturing and processing of metals (5 plants).

In Serbia there are 126 industrial water pollution sources.

Other drivers of environmental risks are related to **agriculture** (using chemical substances and, on the other side, loosing agricultural land due to urban expansion) and **transportation** (as a main source of air pollution).

- **Environmental factors affected by pollution**

Air pollution, in Ukraine, Vynohradivskyi Region has a highest rate of air pollutants emissions within the target area as well as within the whole Zakarpatska Oblast – 12.71t/km^2 or 75.4kg per one person. And Rahivskyi Region has a lowest rate of air pollutants emissions within the target area and is among most clean regions of Zakarpatska Oblast – 2.35t/km^2 or 49.4 kg per one person. Motor transport is a main source of air pollution. The largest share of pollutants from the motor transport is in Rakhivskyi Region – 94.6%.

Nitrate pollution risk was identified for 5 settlements in Romanian territory. They cover 166.39 km^2 within five settlements: Rona de Sus (63.6km^2), Câmpulung la Tisa (33.57km^2), Bocicoiu Mare (27.0km^2), Rona de Jos (22.83km^2) and Sarasău (19.39km^2). The ever bigger amounts of detergent and domestic waste spilled into the water caused the disappearance of species which indicated the quality of water, such as the painter's mussel (Unio pictorum) and the European crayfish (Astacus fluviatilis). Also, one can also register the disappearance of a number of rare faunistic species – the beaver (Castor fiber), due to the loss of its habitat by clearing the floodplain forests and its excessive hunting.

The quality of surface water bodies and underground waters; direct and indirect tributaries of Tisa (Vişeu, Iza, Mara, Ronişoara, Săpânța and Bistra) on the Romanian territory present a high natural value, first of all because of the absence of major pollution sources.

River bank exploitation is not performed accordingly to European regulations, in Romania being present even within Natura 2000 sites. 18 areas have been identified on the Romanian territory of Tisa ecological corridor. They cover an area of 981kmp and have a relatively homogeneous distribution. Their occurrence is caused by human intervention, but also due to morphometric conditions. The highest number of landslides is identified on the administrative territory of Sighetu Marmației, Rona de Sus, Săsar and Remeți. The spatial distribution of ballast pits reveals only one such pit, covering an area of 0.089kmp, while waste dumps are found in two locations, covering an area of 0.089kmp.

Within the Hungarian Tisa catchment, the single largest contributor to the environmental load affecting water quality in terms of quantity is the energy sector (48%); however, most of this discharge is cooling water. As far as total salt pollution is concerned, the processing industry contributes 34%, metallurgy 14%, and thermal water discharge 10%; at the same time, communal sewage is responsible for 36% of the saline discharge. Of all the hazardous substances, toxic metals play the most significant role. This is mostly tied to communal sewage; the contribution of metallurgy and metal processing is between 14 to 33%. Generally, the output of industrial pollutants shows a slowly declining trend. Thanks to

the improving efficiency of sewage treatment and to the fact that environmentally friendly production technologies are used more and more commonly, the quantity of industrial sewage is decreasing, and the sewage generated contains less of the pollutants. Nearly half of the industrial discharge reaches the surface reservoirs not directly but through communal sewage treatment plants.

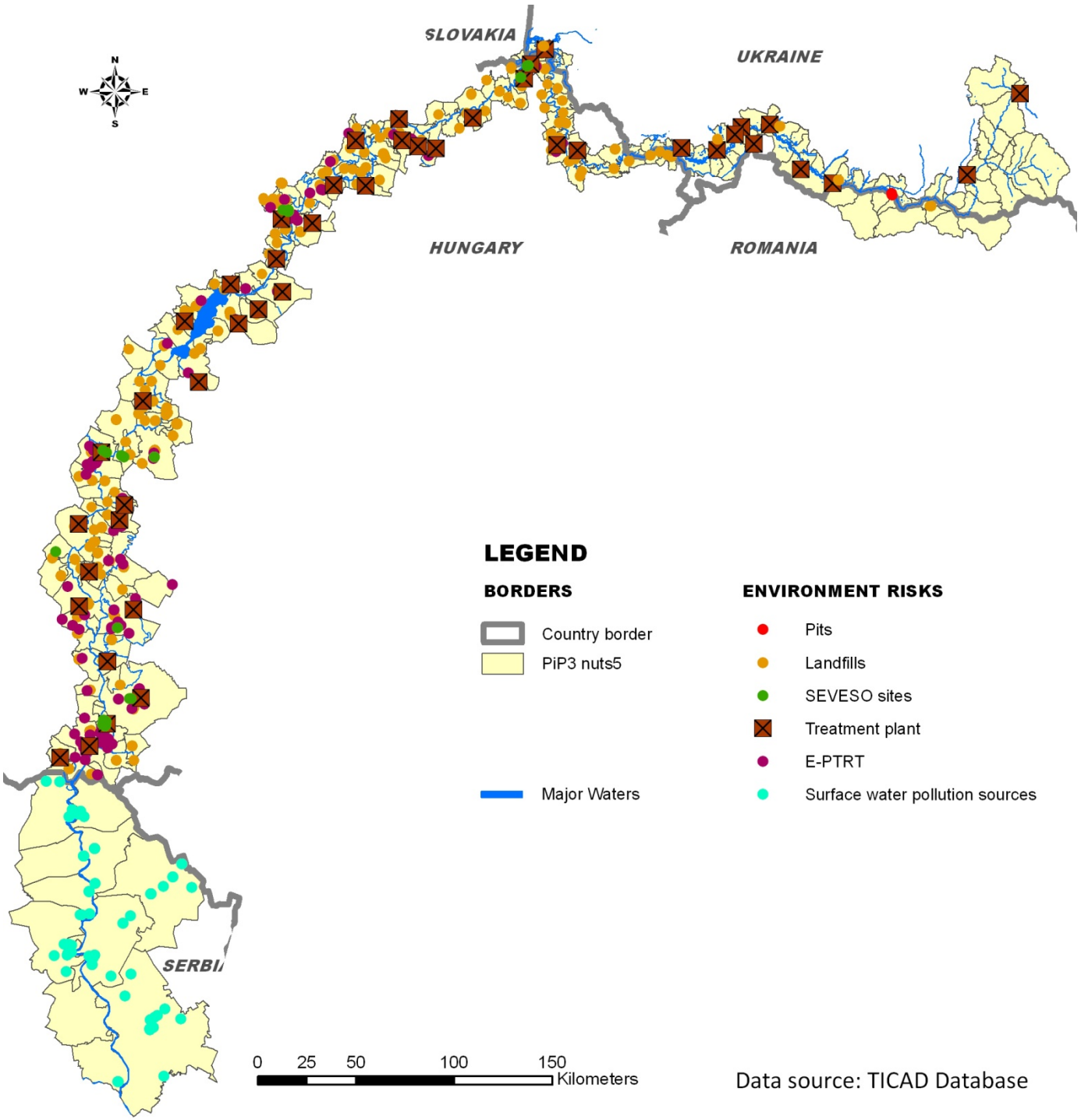


Figure 8. Environment Risks in PiP3 area

- **Water supply and sewerage system**

The main polluters of surface waters in *Ukraine* are the production divisions of water supply and sewage and housing and utilities services in the towns of Berehove, Chop, Vynohradiv and Khust. The public sewerage system gap is close to 100 almost in the whole target area, only in Vynohradivskyi Region it is lower – 95.1. But still numerous villages are devoid of centralized water supply and sewerage, and great amount of sewage water isn't treated before it gets to the river.

The average percentage of dwellings connected to public water supply system for the *Romanian* PiP3 area is of 32.05% (amount that is highly influenced by the situation in the rural settlements where less than half of the dwellings are connected to public water supply system). In the only urban settlement situated in the studied area, the water supply is assured for almost 77% of the dwellings. In addition, individual water supply systems (32%) are preponderant for the dwellings in the rural settlements in the studied area. For the studied area, in 2009 compared to 2001, it can be noticed an upward trend in daily water consumption in about 83.33% of the rural settlements connected to public supply system. Only in Sighetu Marmației and in Săpânța it can be noticed a decrease in the values of daily water consumption; this decrease is partly due to the use of more efficient equipment (in urban areas), but also due to higher costs that led to disconnection from the water supply system in rural areas.

The fact that only a third of the dwellings in rural settlements are connected to public water supply systems proves the insufficient development of the drinking water supply network and thus a low control on the quality of the drinking water; this requires urgent investment to achieve the necessary infrastructure. Regarding the connection to public sewage systems, the situation is worse than in case of connection to public water supply. It is influenced by the situation in the rural settlements, where almost 100% of the dwellings are not connected to sewage systems. In the only urban center of the studied area, only a third of the dwellings are not connected to public sewage systems. This shows the urgent need of investments in the specific infrastructure, mainly in rural areas and also, punctually, in urban areas.

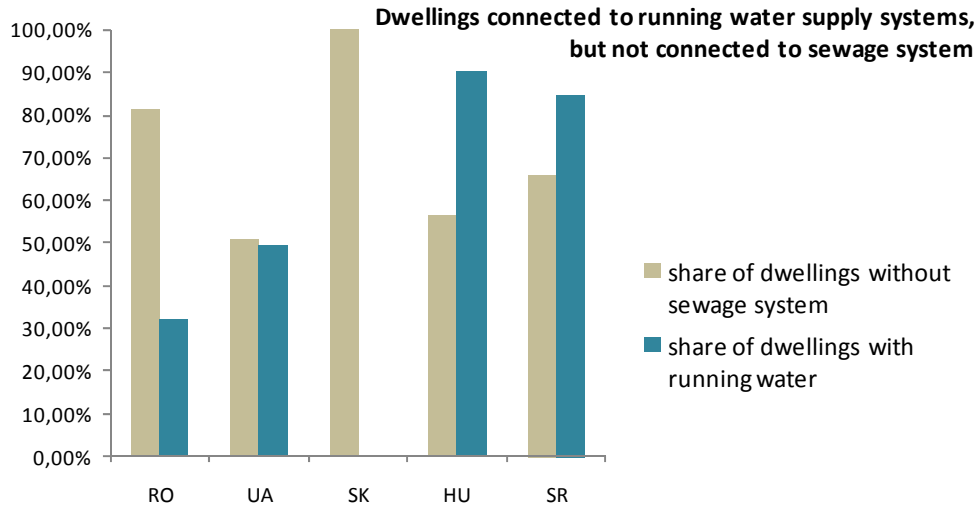


Chart 4. Dwellings connected to running water supply systems, bu not connected to sewage system

In *Slovakia* both municipalities are connected to public water supplies, but there is not public sewage system. Domestic waste waters are either stored in cesspits or drained freely into the environment. Currently, in the village of Veľké Trakany is being built the public sewerage system.

Every settlement in *Hungarian* territory has access to drinking water through a public utility service. In 2009, 298000 households (90.4%) were connected to the network. The remaining households were not connected to the public utility network mostly because of their low income levels or for other reasons; however, this population also has access to drinking water mostly through public wells. In the overall average of the 162 settlements located along the River Tisa, 43% of the households were connected to the sewage network in 2009. 60 settlements within the region under study had no sewage network at all, or the ratio of households connected to the network was less than 20%. Typically, these settlements are small villages of fewer than 5000 inhabitants, except for four settlements with a population between 5000 and 10000 (Tiszaalpár, Fegyvernek, Mindszent, and Sándorfalva) where the lack of a sewage network by now represents a major environmental load. The connection rate of the rest of the region's small settlements is between 50% and 98%. The ten cities within the planning region under study that have a population of over 10000 each have a good sewage connection rate of over 80% except for Tiszakécske (20%) and Tiszaföldvár (68%).
There are 34 communal waste water treatment plants operating within the planning area. The efficiency of purification is often insufficient; 13 sewage treatment plants, including the largest one, that of Szeged, only apply biological purification. The treated sewage generated by the treatment plants that have a discharge flowing into the River Tisa are diluted to the appropriate level wherefore they have no significant impact on the chemical condition of the surface and underground waters.

In the *Serbian* sector the share of dwell with running water is 93% and share of dwell without sewage system is 57%. A total of 7 waste water treatment plants were built, whereof only few operate relatively well. In most cases, waste water is discharged into recipients without any treatment. Building sewage canals in settlements and their respective waste water treatment facilities should be a priority task in the field of communal economy in the forthcoming period.

- **Waste management**

In *Ukraine* there are only four well equipped landfill polygons – in Tyachiv, Khust, Vynohradiv and Chop. Almost near each city and urban-type village and for several neighboring villages there are landfills. They keep negatively effect on environment. Still there are no waste-treatment plants in the region.

In *Romania*, there is only one landfill in Sighetu Marmației. The surface covered by this landfill is about 6.3ha and the available capacity 450000m^3. The year of closure is 2017. In the rural area has been identified a number of dumps, which are generally unmanaged. According to the art. 3 (7) of GD 349/2005 previsions on land filling of waste, all the dump sites in the rural area would have to be rehabilitated after their closure in 2009 by reintroducing this site into natural cycle or by closing according to "Guideline for the closure of existing nonconforming landfills for non-hazardous waste". According to the implementation plan of the landfill, after the date of accession landfills which will stop land

filling will be closed, according to the requirements of Directive 999/31/EC, within a period of maximum 2 years after stopping land filling. The spatial distribution of ballast pits reveals only one such pit, covering an area of 0.089kmp, while waste dumps are found in two locations, covering an area of 0.089kmp.

According to the data of the Statistical Office of the *Slovak Republic*, there was in 2009 produced 250.5tons of waste, which is 94.4kg waste per capita. Development of the total production of municipal waste as well as production per capita in the years 2003 and 2009 was slightly increasing. The most common way of municipal waste disposal is landfilling. Separated municipal waste collection is introduced for paper, glass and plastics.

Each of the 60 *Hungarian* settlements within the area under study is covered by organized communal waste collection. There are only 30 settlements where less than 80% of the households have access to the service. In 2009, a total of 170000 tons of solid waste was generated; based on this figure, per capita annual communal solid waste production is 215kg. The generated communal solid waste is deposited at regional landfills. Since July 2009, nine regional solid waste landfills have operated in the settlements located along the River Tisa; they are in Tiszaszentmárton, Ibrány, Bodrogkeresztúr, Tiszafüred, Szelevény, Felgyő, Szentes, Hódmezővásárhely, and Szeged. The landfills closed down until 2009 are being re-cultivated.

Solving waste management issues is one of the most serious environmental challenges in *Serbia*. Considerable volumes of municipal solid waste are generated in the target area. The absence of central storage area and plant for the treatment of hazardous waste is clear on the national level. A high number of degradation sites are due to the presence of a large number of junkyards and wild landfills (Table 8).

NUTS 3	Municipality LAU1/City	t/2009
Juznobacki	Bečej	10015
	Žabalj	5777
	Titel	3580
Srednjebanatski	Zrenjanin	54637
	Žitište	4283
	Nova Crnja	2667
	Novi Bečej	6583
	Sečanj	3438
Severnobanatski	Ada	3988
	Kanjiza	5776
	Kikinda	16384
	Novi Knezevac	2025
	Senta	5368
	Coka	**2904**

Table 8. Estimated amounts of communal waste per year in the target area
Source: Waste Management Strategy of the Republic of Serbia for the period 2010-2019

	Strenghts	Weaknesses	Opportunities	Threats
Romania	- Reduced dimension of the territory; - Tisa, because of its high flow and cessation of industrial-mining activities, was able to exceed the "critical state" induced as a result of accidental pollution on its tributary, the River Viseu; - There are no large industrial sites (SEVESO) due to the the low level of economic development of the settlements; - Good chemical status; - Large number of water bodies that reach good environmental status, having medium or low confidence.	- 8 economic potential polluters, all in Sighetu Marmației; - 5 zones vulnerable to nitrate pollution; - Large quantities of detergents and household waste discharged into the water; - The exploitation of construction materials from river bed is not done according to the specific studies of environmental impact; - Existence of two dumps; - Existence of pits.	- Starting new public and private investment projects	- Additional accidental pollution - Permanent increase in pollution
Ukraine	- Non industrial character of the economy of the target area determine lower pollution rate.	- Insufficient development of sewerage and water treating system; - An absence of well organised waste-treatment system.	- Possibility to develop cross-border waste-treatment system.	- River ecosystem degradation in the result of water pollution by untreated sewage waters.
Slovakia	- Good chemical and quantitative status of groundwater bodies; - Connection to the public drinking water supply system; - Low level of air pollution due to absence of industry.	- Poor ecological status and chemical status of surface water bodies; - Missing public sewerage system.	- Utilization of the state support programmes and the EU programmes for effective system of waste management and completion of waste recovery infrastructure.	- Lack of funds and investments; - Continuous pollution of surface waters.

Hungary	- The generated communal solid waste is deposited at regional landfills; - Industrial pollutants shows a slowly declining trend.	- The 162 settlements located along the River Tisa, only 43% of the households were connected to the sewage network in 2009; - Efficiency of waste water purification is often insufficient; - There are 23 Seveso plants within the area under study. Ten of these are hazardous plants with a lower limit value, while 13 are hazardous plants with a higher limit value.	- Environmentally friendly production technologies are used more and more commonly; - The presence of the sewage treatment national strategy.	- Lack of financial resources; - Lack of environmental awerness.
Serbia	- The presence of the waste management national strategy; - The existence of legislation in conformity with the EU legislation.	- Absence of central storage area and plant for the treatment of hazardous waste, on the national level; - A high number of degradation sites due to the presence of a large number of junkyards and wild landfills.	- Rehabilitation of wild junkyards and remediation of contaminated soil; - Availability of EU funds and intensification of international cooperation through the integration process.	- Lack of financial resources; - Degraded environment.

Table 9. SWOT analysis on Environmental Risks in PiP3 area

Land Use and Protected Areas

- **Land use**

Land use evaluation is a key component in assessing the environment quality of Tisa River corridor, based on the CORINE land cover classification (European Environmental Agency, 2002 and 2006). Land use - cover change biome is a complex, dynamic process that links together natural and human systems. Moreover, it is considered to be one of the major drivers of changes in terrestrial ecosystems.

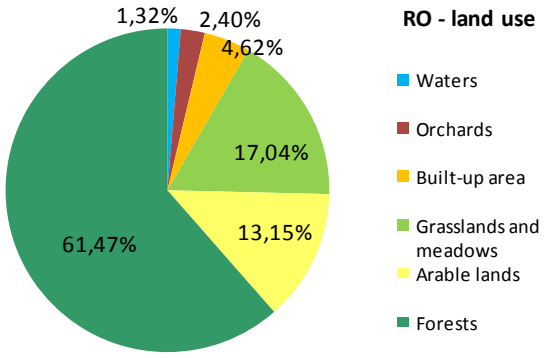


Chart 5. **Land use type , in Romanian PiP3 area**[7]

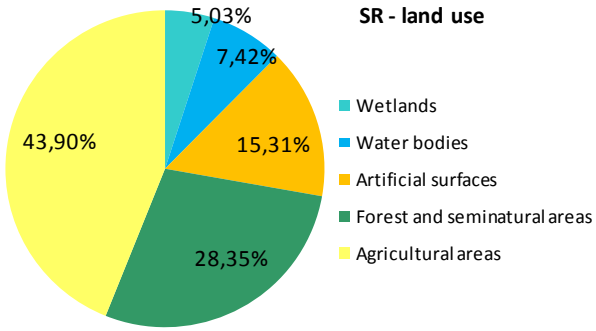


Chart 6. **Land use type , in Serbian PiP3 area**[8]

The forest and semi natural land use of Tisa River corridor portrays a large share of this category in ***Romania***, where forests cover 61.47% of the considered territory (*Chart 5*). Among them, broad-leaved forests are predominant (39.69%), followed by the transitional woodland-shrub areas (13.06%), sign of an intense forestry activity. Broad-leaved forests have important weights in the communes who have extended areas in the low mountains, foothills and hills: Remeți (61.74%), Rona de Sus (51.24%), and Săpânța (49.92%). The minimal values are recorded in the communes with small areas, extended along Tisa: Bocicoiu Mare (14.82%), Sarasău (19.67%). Mixed forests (6.35%), included both broad-leaved and coniferous species, are found at higher altitudes and are characteristic especially in Bistra commune (23.48%), whose administrative territory is extended significantly in Maramureş Mountains. The same commune, Bistra, has the highest weight of coniferous forests (5.74%), which cover only 2.37% at the level of the entire analyzed space as a result of the small territorial extension at the height where coniferous species are predominant. The transition woodland-shrub areas, indicating young forests and recent clear-cuttings, are significant in the analyzed territory. One should stress their presence within Sighetu Marmației city (23.17%) and the communes nearby (Câmpulung la Tisa 17.41%), where the more intense forestry activity is probably linked to the growth of the wood processing industry in the city. The forest areas included in protected areas or in NATURA 2000 sites cannot be included in the production system and it is not possible to change their use.

Grasslands and meadows represent the second largest land use type in Romania (17.04%), after the forests. One should underline the high weight of natural grasslands (7.44%), mainly located on the high plateaus of Gutâi Mountains, with a value close to that

[7] according to CORINE Land Cover, European Environmental Agency 2000
[8] Id.6

of pastures (9.60%). Pastures are characteristic for the communes covering important areas along Tisa, especially near Sighetu Marmației: Sarasău (23.88%), Rona de Jos (21.68%), Câmpulung la Tisa (18.97%). They occur, in different weights, in all the administrative units of the analyzed territory. However, natural grasslands emerge in only two communes: Săpânța (14.69%) and Bistra (6.17%), as well as in Sighetu Marmației (14.40%). They are present at higher altitudes in Gutâi Mountains, on the plateaus and in the subalpine level of Maramureş Mountains.

In ***Ukraine***, the Rakhivskyi Region is mainly mountainous, resulting in a high share of forest lands. ***Slovakia*** benefits from a favourable proportion of forests in the village Malé Trakany (2.74%). The presence of other landscape elements is not particularly significant. There are mainly oak and elm forests in the target area. ***Serbia*** encompasses a 27.95 share of forests and semi natural areas.

Within the ***Hungarian*** sector, grasslands (meadows and pastures) take second place by area. In this region, the ratio of pastures within the total area is about 10%; within the flood prone area, it is 8%. From an ecologic perspective, natural grasslands are most valuable, representing about 3.5% of both the total area and of the flood prone area. Traditionally, grasslands have been used as pastures. In addition to preserving this form of floodplain economy, grasslands also play a key role in the survival of valuable herbaceous plant species and a rich fauna of invertebrates. Shrubs consisting of diverse associations of species represent 1.4% of the area under study. Their importance lies in their role as floodplain habitats; in the flood prone area, they represent as much as 4.5% of the total area. The flood prone area is highly exposed to disturbing factors (forest management, agricultural activities, flood protection measures, etc.), a circumstance conducive to the spreading of invasive woody and herbaceous plant species. By their aggressive spreading, these mostly non-endemic plant species displace the indigenous plant species, leading to the overall deterioration of the habitats. Within the area under study, the proportion of forests is very low, at a mere 7.9%. Most of the deciduous forests are within the flood prone area; here, they represent as much as 33% of the area. Ecologically, forests as complex habitats play an outstanding role. However, in most of the area under study, the native forests once typical of the landscape have mostly been replaced by plantations of poplar cultivars. These forests have a poor diversity of species; they have no shrub level at all; accordingly, they function very poorly as a habitat. The softwood and hardwood alluvial forests once so typical of the Tisza floodplain have only survived in isolated patches enjoying environmental protection. Although forests play an important ecological role, floodplain forests are a challenge in the context of flood protection as they significantly slow down the flow of flood waters, impede ice drifting, and generate drifting organic matter that blocks river management structures.

The agricultural land use of the corridor is less significant in the ***Romanian*** sector of Tisa ecological corridor, where arable lands represent only 13.15%, fact explained by the predominantly mountainous and hilly landforms. The few lands with agricultural potential are found in the floodplains and on the terraces of the main rivers – Tisa and its tributaries, Vişeu, Iza, and Săpânța. The non-irrigated arable lands cover only 3.69% of the territory. The mountainous morphology as well as the hilly landforms of Maramureş Basin, due to the gradient of slopes and the low fertility of soils, restricts the agricultural use of the lands. The areas with low declivity of the plateaus in Gutâi Mountains are situated at large distances from settlements, a fact which hinders their integration in the economic system. The

economic crisis determined an increase in the number of abandoned arable land plots. Higher values are registered in the communes whose territory is extended along Tisa River: Sarasău (20.96%), Bocicoiu Mare (16.30%), Câmpulung la Tisa (8.71%). Some communes (Bistra, Rona de Sus) do not have at all non-irrigated arable lands. The complex cultivation patterns are even less representative (2.97%), although they occur everywhere as a result of the high fragmentation of lots. Higher weights are characteristic for Bocicoiu Mare (10.33%) and Rona de Jos communes (7.67%). Most of the arable lands seem to be those which include important areas of natural vegetation, amounting to 6.49%. This number suggests a subsistence agriculture, therefore some plots are left fallow, uncultivated, either due to the lack of labor force or for the natural rejuvenation of soil fertility. The same communes comprise important predominantly agricultural lands, with significant areas of natural vegetation: Câmpulung la Tisa (21.13%), Rona de Jos (18.34%) and Sarasău (12.15%). For this part of the corridor, orchards are also representative for the area of study, as they amount to 2.4% of the total area. They cover large areas (10.10%) in Remeți commune, in the westernmost corner of the analyzed space, and have weights above the average in Bocicoiu Mare (4.53%) and Sighetu Marmației (2.93%).

In ***Ukraine***, agricultural lands are represented mostly with pastures in Rakhivskyi Region. Upper on the hills there are natural grasslands which are also freely used for pasturing by local people. Khustskyi and Tyachivskyi Regions have rather less share of forests and higher share of agricultural lands both arable land and permanent crops. Within Vynohradivskyi, Berehivskyi and Uzhorodskyi Regions the share of forests gets very small and the share of agricultural land much higher. The arable land dominates in flat regions and in foothills the share of permanent crops is rather high. In ***Slovakia***, from the aspect of proportion of natural elements, arable lands cover 48.64% and permanent grasslands 25.94% of the total area of the target area. ***Serbia*** has a percentage of 44.68% agricultural areas, being the dominant land use type.

Within ***Hungary***, the areas located along both banks of the river have been typical agricultural landscapes since the regulation of the river. Consequently, the largest portion of the area (59%) is cultivated as arable land (non-irrigated). Large plots of intensively farmed land take up most of the arable areas; ecologically, these have the least value. Most of the natural habitats have been confined to areas either within the embankments or unusable for agricultural purposes (such as, e.g., low marsh areas and alkaline grasslands). Within the area under study, arable lands represent a large proportion (23%) even within the flood prone area. Using flood prone area for intensive agricultural production, which inevitably involves the use of chemicals and fertilizers, is not desirable ecologically because it represents a significant intervention into the fauna and flora of the area. In addition, with a view to the risk of regular flooding, it is doubtful whether intensive agricultural farming makes any sense within flood prone area at all. The heterogeneous agricultural areas (3.4%) are mixtures of small parceled arable lands, orchards, forests, grasslands, reeds, etc. side by side. Within the flood prone area, these areas represent 4%. In these areas, certain signs of the traditional floodplain economy may still be observed; this was an economic system that used the landscape in a manner taking full account of the local conditions of the area in terms of elevation, water regime, and soil characteristics. There is a greater chance for the survival of semi-natural habitats within mixed use areas of a smaller patch size, and these areas also play an important role in maintaining ecological links.

Water bodies have a higher weight than the average of ***Romanian*** part of Tisa catchment area, 1.32%. This is mainly due to water courses (Tisa most of all) which represent 1.10%, a much higher value than the above-mentioned average. The other 0.22% represent marshes (wetlands) mainly located also in Tisa flood plain, as it comes out from their distribution in Bocicoiu Mare commune and Sighetu Marmației city. In ***Slovakia***, a significantly positive fact from the aspect of level of anthropic load on the environment of the target area is favourable proportion of water areas (6.30%). In ***Hungary***, as far as surface waters are concerned, their outstanding importance lays not so much in their territorial ratio (3.4%) but rather in the role they play within the biosphere. The system of surface waters consists of rivers, their tributary watercourses, natural and artificial lakes, and channel networks created after the regulation of the river. The most typical habitats of the area under study are its natural and artificial oxbow lakes, which offer habitats to many rare animal and plant species while also playing a role in recreation (angling and water sports). Although the marshes found within the area under study (1.3%) do not play any significant economic role, their ecological importance is outstanding. Covered with shallow water either permanently or seasonally, these areas are the last reminders of the ancient conditions once typical of the entire Tisza Valley. It is fair to say that marshes and bogs are the least disturbed habitats along the River Tisza as they have only survived in the lowest areas, mostly within the flood prone area, where human interventions to drain the area for good, or to convert it into areas suitable for other forms of use, have failed. Within the flood prone area, marshes with their rich selection of species represent nearly 5%. **Serbia** has a share of 7.32% water bodies.

The built-up surfaces are significant for the ***Romanian*** part of the corridor, where they cover an important area, 4.62%, also due to the process of household scattering on hilly or mountain slopes. The largest part, 4.44%, is represented by discontinuous urban spaces, while the industrial and commercial units, exclusively located at Sighetu Marmației, cover 0.18%. In ***Ukraine***, as the settlement concentration is attracted by rivers in the whole Zakarpatska Oblast the target area along Tisa River has a high share of built-up land. In ***Hungary***, within the built up areas, residential areas occupy 5% while areas in industrial and commercial use represent less than 1%. The built up areas have almost completely lost their functions as natural habitats. It is important to note that some of the residential areas are in fact located within the flood prone area (1.3%) and function mostly as resorts or are occupied by technical infrastructure. These resort areas are usually not supplied adequately with public utilities; as a result, high levels of environmental load may occur during the tourist season. Thousands of people visit these floodplain areas that may also disturb the natural environment. Various forms of line infrastructure (mostly high-speed public roads and railways) disrupt the links between the various habitats and represent barriers to migration.

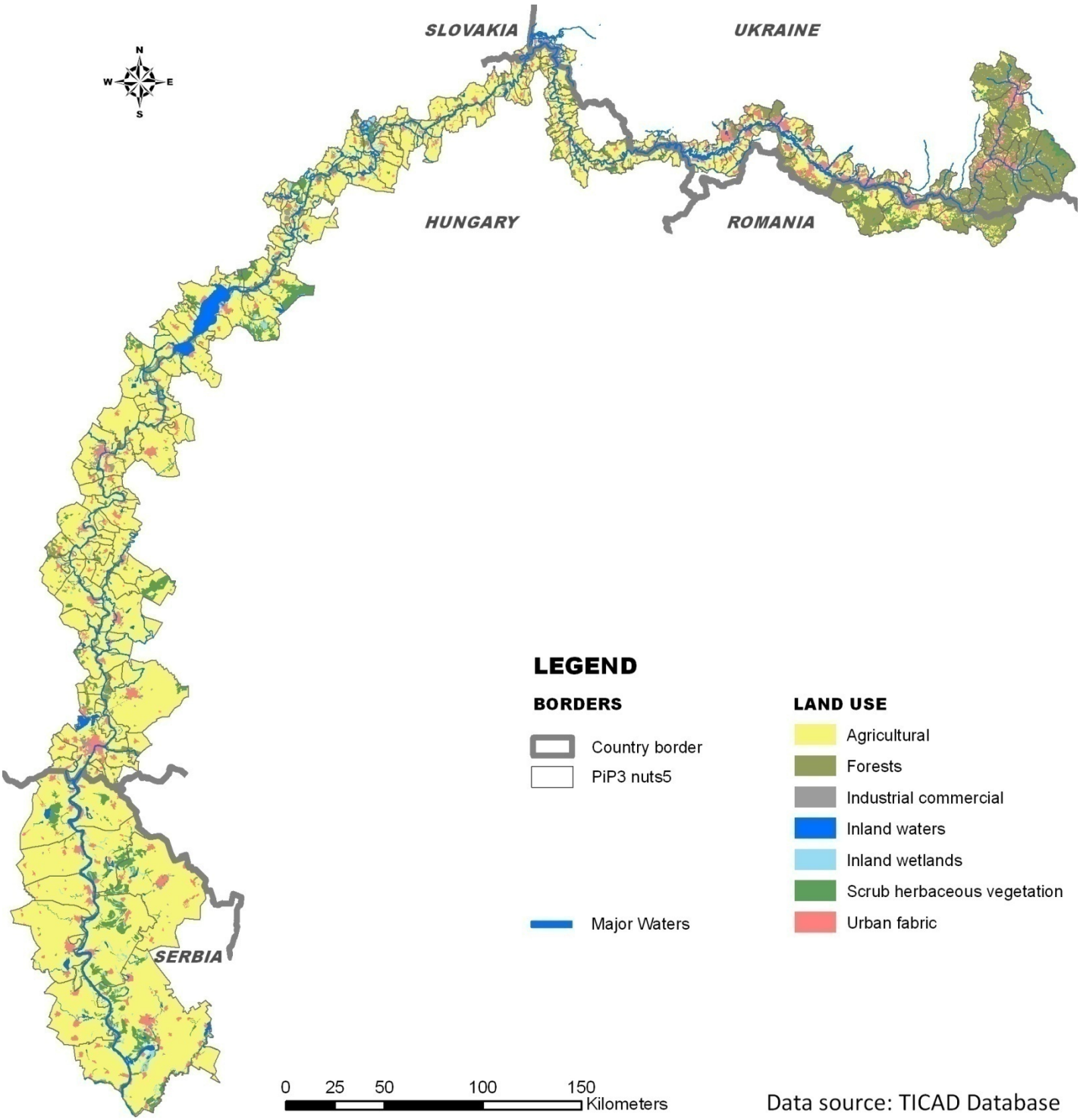


Figure 9. Land use types in PiP3 area

Land use change problems occurring in the Tisa River corridor reflect in the ***Romanian*** case in the significant forest clearings, which have negative consequences from an economic and ecological point of view, as well as for the landscape quality. They are highlighted by the very high weight of transitional woodland-shrub areas (more than 13%) situated near the industrial wood processing center. At the same time, there is an ongoing process of making the forest thinner, by illegal cuts of individual trees from place to place, especially in broad-leaved forests, in areas vulnerable to natural risks like the slopes. The overgrazing on sloped areas may also generate landslides, depending on their degree of vulnerability to risk. It is clear the replacement of mixed and coniferous forests with grasslands, especially on the high plateaus of Gutâi Mountains and Maramureş Mountains. Arable lands have a low productivity, due to the less favorable physical-geographical conditions. A relatively high number of arable plots are abandoned and left fallow, a fact suggested by the high weight (more than 6%) of predominantly agricultural lands, with significant areas of natural vegetation.

Land use focus on the Hungarian sector of Tisa corridor

To make the land use analysis of the area under study easier, and to ensure that relevant differences in natural geography and landscape use patterns are fully taken into consideration, we have established three sections within the area under study: 1) The Upper Tisa section between the border and Tokaj, 2) The Middle Tisa section between Tokaj and Szolnok 3) The Lower Tisa section between Szolnok and the border.

I. The Upper Tisa section between the border and Tokaj

The 66 settlements forming part of the Upper Tisa section represent an area of 153,506 ha, which is 20% of the total area under study. 21.84% (33,526 ha) of the area of Section I is within the embankments. Within this section, the most typical land uses are of an agricultural character, the cultivation of arable lands taking the lead. The proportion of arable lands within this section is 54.2%; the same indicator for the flood prone area is 32.3%. Within the section under study, grassland areas, which play a significant ecological role, occupy an important portion (13.7% or 21,061 ha). Of this, pasture areas represent 11.4% while natural grasslands occupy 2.3%. The ratio of grasslands is also significant within the flood prone area where pastures represent 9.8% while natural grasslands occupy 4.7%. Traditionally, grasslands have been used as pastures. Permanent plantations occupy 4.7%. The Upper Tisa region (especially the wine region at the foot of the Tokaj hill and its areas and Szabolcs Szatmár-Bereg County) has traditionally been a region of fruit production. The most typical fruits are grapes and apricots around Tokaj, apples and sour cherries in Szabolcs, and plums and walnuts in Szatmár. 2% of the fruit plantations are located within the flood prone area; this in fact should be seen as a traditional type of land use in the area. Traditionally, the floodplains of most settlements used to have orchards of species – mostly walnuts, plums, and apples – and varieties that tolerated being flooded seasonally for certain periods of time. Most of these ancient orchards have disappeared by now; they have either been replaced with new plantations or natural forests have taken them over. However, a number of settlements (such as, e.g., Kisar) still preserve some floodplain orchards, many of which have long fallen out of use and have become "jungle orchards". These areas are important reminders of what the local alluvial economy must have been like. In addition, the old varieties surviving in these orchards are tolerant to extreme environmental conditions; in fact, they are valuable natural gene reserves for old fruit varieties. Within the Upper Tisa section, the ratio of broad leaved forests is relatively low at 10.7%. Within

the flood prone area, the same indicator is ecologically more favorable (23.8%). The ratio of surface waters (2.9%) is of key importance for the wildlife of the section under study. Within this section, 11% of the flood prone area is covered by water; this includes the River Tisa and its oxbow lakes. Within the section under study, the ratio of built up areas is 5.8%; much of these areas are residential. The residential areas located within the flood prone area (1.3%) primarily belong to a number of larger resort areas (Tivadar, Vásárosnamény-Gergelyiugornya, etc.) or are occupied by the related technical infrastructure.

II. The Middle Tisa section between Tokaj and Szolnok

The 55 settlements forming part of the Middle Tisa section represent an area of 296,562 ha, which is nearly 40% of the total area under study. 14.41% (42734.6 ha) of the area of Section II is within the embankments. Within this section, the most typical land uses are of an agricultural character, the cultivation of arable lands taking the lead. The proportion of arable lands within this section is significant at 61.2%; the same indicator for the flood prone area is 14.8%. Within the section under study, grassland areas, which play a significant ecological role, occupy an important portion (15.2%). Of this, pasture areas represent 9.4% while natural grasslands occupy 5.8%. The ratio of grasslands is also significant within the flood prone area; pastures represent 8.6% while natural grasslands occupy merely 0.7%. The section under study includes famous grassland areas (Hortobágy, Borsodi-Mezőség, and the Heves Grasslands). Some of these are primary natural grasslands; others are secondary alkaline grasslands created after the regulation of the river. Today, these large expanses of grassland preserve, as well as display, the traditional life of the Hungarian puszta. Thanks to their rich wildlife typical of grassland habitats, most of these areas also enjoy nature protection. Within the Middle Tisa section, the ratio of broad leaved forests is low at merely 7%. The main reason behind this is the relatively fertile soil of the region, which has attracted expansive agricultural activity. The existing forests are located mostly within the flood prone area; here, they represent as much as 33% of the total area. The ratio of surface waters (4.8%) is of key importance for the wildlife of the section under study. Within this section, 25% of the flood prone area is covered by water; much of this is the surface area of Lake Tisa (12,700 ha). Established at the end of the 1970s by damming, its original objective was to store water and to generate hydroelectric power. However, over the past several decades, nature has reoccupied the flooded area, creating one of the most important aquatic habitats of the country. The most valuable areas of the lake are protected under several international treaties (Ramsar, UNESCO MAB, etc.) and the entire lake forms part of Hortobágy National Park. Not only does it have diverse wildlife, the lake also has several bays that attract large numbers of tourists. Within the section under study, the ratio of built up areas is 5.4%; a large-scale residential area is concentrated around the county seat Szolnok. The residential areas located within the flood prone area (1.2%) primarily belong to a number of larger resort areas (Szolnok) or are occupied by the related technical infrastructure.

III. The Lower Tisa section between Szolnok and the border

The 41 settlements forming part of the Lower Tisa section represent an area of 307,165 ha, which is just over 40% of the total area under study. Merely 9% (27,890.5 ha) of the area of Section III is within the flood prone area. Within this section, the most typical land uses are of an agricultural character, the cultivation of arable lands taking the lead. The proportion of arable lands within this section is 66.8%; the same indicator for the flood prone area is 24.21%. The high proportion of arable lands is due to the good quality of the soil. In addition to large-scale production mostly concentrating on cereals and oil seeds, this region is also famous for its vegetable horticulture (Szentes, Mórahalom). Within the section under study, grassland areas, which play a significant ecological role, occupy an important portion (10.6%). Of this, pasture areas represent 8.1% while natural grasslands occupy 2.3%. As in other regions, most of the grasslands consist of alkaline grassland areas that are home to a valuable flora and fauna and

that mostly enjoy environmental protection. The ratio of grasslands is also significant within the flood prone area; pastures represent 6% while natural grasslands occupy 5%. Permanent plantations occupy 2.2%. Along the Lower Tisa, some of the areas forming part of the Csongrád wine region have traditionally been regions of fruit production. Within the Lower Tisa section, the ratio of deciduous forests is rather low in comparison to the other sections (5.9%). The main reason behind this is expansive agricultural activity. Like in other sections, the existing forests are located mostly within the floodplain; here, they represent as much as 41.5% of the total area. The ratio of surface waters within the section under study is 2.5%. Within this section, 11.7% of the floodplain is covered by water. The large fishponds around Csanytelek and Szeged play a key ecological role within the region. Within the section under study, the ratio of built up areas is 5.9%; much of this is residential. Most of the residential areas are concentrated around the county seat Szeged. The residential areas located within the floodplain (1.5%) primarily belong to a number of larger resort areas (Csongrád, Mártély, and Szeged) or are occupied by the related technical infrastructure.

- **Protected areas**

Legislative context

In ***Romania***, the management of protected areas follows the stipulation of Law no. 5/2000, concerning the approval of the National Territory Arrangement Plan, Third Section – Protected Areas. The setting up of Government Decree no. 57/2007 had the role of harmonizing the national legislation with that of the European Union in the field of nature protection. It created the institutional framework for the application of the stipulations contained in the 79/409 CEE Directive regarding the conservation of wild birds and the 92/43/CEE Directive concerning the conservation of natural habitats and of wild flora and fauna species and established the sanctions for the infringement of these provisions. Tisa Area is considered to be an important passage corridor for many species of migrating birds (Anas plathyrhynchos, Anas querquedula, Anas crecca, Podiceps (Tachybaptus) ruficollis, Cygnus olor, Gavia arctica, Gavia stellata, Bucephala clangula, Larus ridibundus, Phalacrocorax carbo, Cinclus cinclus, Grus grus, Ardea purpurea, Vallenus vallenus ş.a.). In ***Ukraine*** the system of nature reserve territories of Ukraine is formulated by the Law of Ukraine "On Nature Reserve Fund of Ukraine" (1992). According to the Law, 11 categories of nature protection objects are distinguished: strict nature reserves, biosphere reserves, national nature parks, reserves (habitat/species protection area), nature monuments, regional landscape parks, protected landscape, botanical gardens, zoological parks, dendrological parks, and parks-monuments of landscape art.

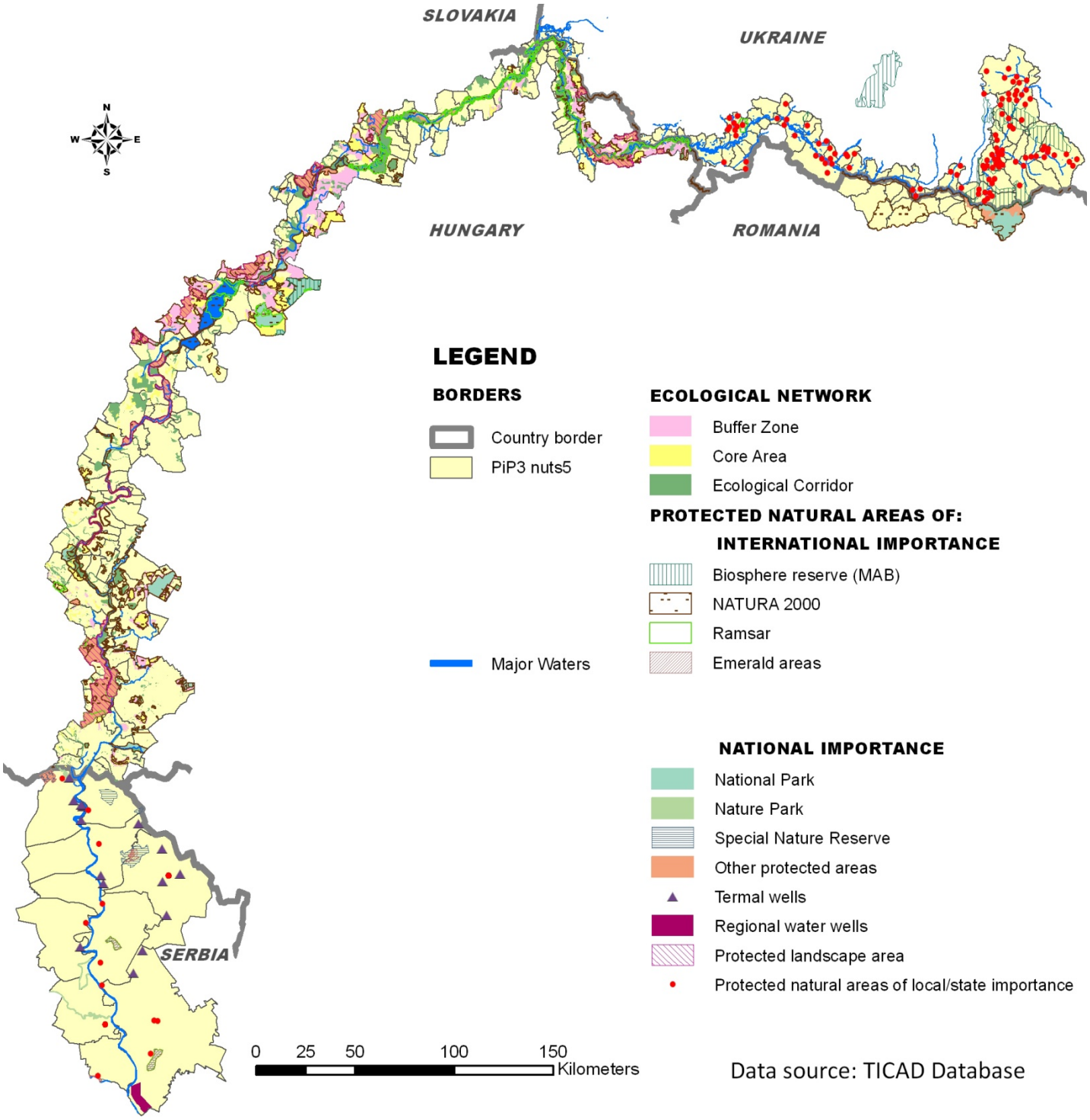


Figure 10. Protected areas in PiP3 area

Natural protected areas

The following table summarizes the main sites included in a protected regime due to the high ecological value and the representativeness as a natural heritage for the considered countries:

Country	*Site*	*Main features*	*Type*
ROMANIA	*Poiana Brazilor Marsh Reserve*	It is situated on Igniş Plateau, in Giuleşti commune, covering an area of 3.0ha. It represents a fragment located at the bifurcation of two extended marshy areas: *Valea Brazilor Stângă forested marsh* (length 1.0km, width 100 – 150m) and *Valea Brazilor Dreaptă peat bog* (length 1.0km, width 150 – 200m).	Natural protected areas, according to Law no. 5/2000
	Coştiui Larch Reserve	Situated in Rona de Sus commune (Coştiui village), at an altitude of 575 m, covering an area of 0.7 ha, including Larch trees aged between 125 and 150 years old, with 80 - 90cm diameter and a height of about 35m.	
	Ronişoara Forest Reserve	Located in Rona de Sus commune, covering an area of 62.0 ha, at an altitude of about 500-600 m, predominantly including sessile oaks.	
	Tomnatec – Sehleanu Daffodil Reserve	is a botanical and landscape reserve, situated in Repedea settlement, covering an area of 100.0ha	
	Dealul Solovan Reserve	located in the southern part of Sighetu Marmației City, it extends over 1.02ha and is established around the cave on Solovan Hill	
	Igniş Plateau	ROSCI 0092	Natura 2000 site, according to Government Decree no. 57/2007
	Maramureş Mountains	ROSCI 0124	
	Upper Tisa	ROSCI 0251	
	Iza Valley and Solovan Hill	ROSCI 0264	
UKRAINE	*Carpathian Biosphere Reserve*	Its area is at present 61,138.8ha. It is located in Rakhivskyi, Tyachivskyi, Hustskyi and Vynohradivskyi Regions. Its territory has a cluster structure. The Reserve massifs are located at the altitudes from 180 to 2061 m above the sea level in the western, central and eastern sectors of the Ukrainian Carpathians. Such territorial structure of the Carpathian Biosphere Reserve almost completely represents the landscape and biogeographically diversity of Eastern Carpathians. Presented there are little touched and virtually undisturbed by human activity piedmont oak plantations, mountain beech, mixed and coniferous forests, subalpine and alpine meadows, pine-alder crooked forest and rocky-lichen landscapes. Almost 90% of the territory is covered by forests – mostly by primeval forests.	In 1992 it was included to the World Network of Biosphere Reserves and in the World Network of UNESCO. Besides, it was awarded the European Diploma of Protected Areas

SLOVAKIA	*Alluvium Tisa*	It covers an area of 1,815.24ha. The Alluvium Tisa includes 5-km stretch of the Tisa River in Slovakia and its alluvium in the border zone with Ukraine and Hungary. Locality is declared as the transboundary Slovakian - Hungarian Ramsar site - The Upper Valley of the Tisa. Parts of the alluvium are permanently and periodically flooded. There are also fragments of floodplain forests and shrubs, the dead river channel formed by meandering rivers in the past and grasslands typical for alluvium of large rivers on The Eastern Slovak Lowlands. There is also recorded the occurrence of rare species of flora and fauna. This locality is important in terms of landscape, nature conservation, sport fishing, recreation and regulated tourism, hunting, grazing livestock and scientific research.	Ramsar site
HUNGARY	*National Park of Hortobágy*	The entire territory of the *National Park of Hortobágy* forms part of a UNESCO Biosphere Reserve. It incorporates the famous alkaline grasslands, the fishponds, and Lake Tisza.	UNESCO Biosphere Reserve
	Körös-Maros National Park	Two units of the *Körös-Maros National Park* are within this section of the River Tisza. The Grasslands of Cserebökény enjoys protection because of its surviving steppe landscape, natural pastures, marshlands, and unique bird fauna, each of which are worthy of preserving. Within the floodplain of the River Körös, secondary landscapes emerging after the regulation of the river survive, combining fragments of the ancient, vast aquatic habitats with a handful of new habitats that owe their existence to human intervention (such as, e.g., clay pits). The remnants of the former meanders surviving in the floodplain – along with the grasslands and alluvial forests – preserve the ancient marshland character of the Great Plain that has since disappeared in most other places.	National park
	Kiskunság National Park	The area under study incorporates the smallest units of the *Kiskunság National Park*, the Szikra Oxbow and the Alpár Grassland. The natural and artificial oxbows – former meanders of the River Tisza – and the alluvial forests and floodplain meadows still preserve a natural condition that goes back to several centuries.	National park
	Upper Tisza	Registered in 2003, the *Upper Tisza* area covers almost all of the affected flood prone area (between the dikes) along the river. What makes this area valuable is its alluvial forests, softwood groves, reed-covered littoral zones, marshes, bogs and wetlands, including the related fauna, which is especially rich in birds.	Ramsar site

	Bodrogzug	*Bodrogzug* has been a Ramsar area since 1989. This section of the River Tisza floodplain has wide expanses of wet grasslands, marshes, softwood groves, as well as open water surfaces and areas covered by aquatic vegetation. It is home to a rich diversity of birds. The area is famous for its heron colonies and for the large number of water fowl that live here. During the period of migration, as many as 20,000 birds make their appearance here.	Ramsar site
	Hortobágy	The area of the grassland *Hortobágy* has been registered since 1979 as a wetland habitat of international importance. Along with Lake Tisza, it is one of the most diverse wetland habitats of the region, one of Hungary's most important bird habitats. It is the nesting site of several highly protected bird species, with many rare species making their occasional appearance here. During the winter, the wetland habitat of Hortobágy is a feeding and resting ground of key importance to birds.	Ramsar site
	Salt lake of Csongrád-Bokros	The *Salt lake* of *Csongrád-Bokros* is a sanctuary of valuable plant and animal species typical of alkaline lakes. In addition, it also plays an important role as a resting and feeding ground for migratory birds.	Ramsar site
	Mártély	*Mártély* has a vegetation and wildlife typical of the aquatic associations found in the floodplain of the River Tisza. In addition to reeds, it incorporates dry and wet pastures combined with oak-elm and willow-poplar alluvial forests. Mártély is a very important nesting a feeding ground both for local and migratory water fowl. It is also home to one of the more significant otter populations of the country.	Ramsar site
	Pusztaszer	The *Pusztaszer* area is highly fragmented: it consists of five different wetland habitats connected by alkaline areas and agricultural lands. Of these, Lake Csaj, Lake Fehér, and Fertő function as fishponds and are surrounded by wide stretches of reed. The wetland habitats of Sasér and Labodár are backwaters of the River Tisza with their typical wildlife and vegetation.	Ramsar site
	Szatmár–Bereg Plain	The *Szatmár–Bereg Plain LPA* was created in 1982. It is a landscape protection area of a fragmented, patchwork-type structure. Almost completely flat, the area was historically covered by vast forests spotted by bogs and marshes. Because of water management interventions, the draining of mashes, and agricultural expansion, the original vegetation has been split up into smaller unit; nonetheless, it still preserves a great degree of similarity to its original condition. The fragmented area shelters diverse wildlife as well as a rich cultural heritage.	Landscape protection area (LPA)

	Tokaj–Bodrogzug	The *Tokaj–Bodrogzug LPA* was created by consolidating tow neighbouring areas that are completely different from one another in terms of their natural characteristics and wildlife. Mount Kopasz of Tokaj, a volcanic hill, has been famous for its wine production for centuries. However, in areas unsuitable for viticulture, the surviving fauna and flora has retained its exceptional diversity. While some of the south-facing areas are almost Mediterranean in nature, the northern side of the mountain is fundamentally continental in its climate. The thermophilous downy oak forests and rock grassland associations of the southern slopes are highly protected. Skirted by valuable steppe grasslands, the hill is home to a rich fauna of reptiles and birds. Bodrogzug is an area of thousands of hectares rich in wildlife located right where the rivers Tisza and Bodrog meet. Already mentioned in the section on Ramsar areas, Bodrogzug is the only part of the country that is exposed to regular, uncontrolled flooding, a rare circumstance guaranteeing natural conditions for a variety of valuable animal and plant species.	LPA
	Kesznyéten	The *Kesznyéten LPA* incorporates a plain delineated by the rivers Tisza, Takta, and Sajó, and by the Dead Tisza of Tiszalúc and scarred by oxbow lakes and abandoned meanders.	LPA
	Borsod–Mezőség	The *Borsod–Mezőség LPA* consists of two easily distinguishable micro-regions. The grassland *puszta* is a single grassy plain zigzagged by meandering marshes. The dry grasslands include some ancient loess steppe grasslands traditionally used as a pasture. The plant species found here are partly those known from the plains, and partly steppe and forest steppe species migrating down from Bükkalja, the foot of the hill Bükk, along the streams. The Borsod–Mezőség LPA is still home to ancient types of alkaline grasslands, although water management has contributed to the formation of secondary grasslands as well. In lower areas, which were formerly floodplains, various marshland habitats and gallery forests are typical.	LPA
	The Grasslands of Heves	*The Grasslands of Heves LPA* was created in 1993 in order to protect the man-shaped *puszta* grassland habitats located in the south of Heves County as well as their fauna and plant associations.	LPA
	Central-Tisza	The *Central-Tisza LPA* is a landscape protection area created in 1978 within the floodplain of the River Tisza between the settlements Kisköre and Tiszaug. It preserves the secondary landscape that emerged during the roughly one hundred years after the regulation of the river.	LPA

	Pusztaszer	The *Pusztaszer LPA* continues to preserve valuable natural conditions with its semi-natural alkaline lakes, large fishponds, alluvial forests, and patchy alkaline grasslands. One of the best known parts of this landscape protection area is Lake Fehér at Szeged. This system of fishponds is still home to a great diversity of bird species. Thus far, 280 bird species have been observed at the lake and in its vicinity. The fishponds are periodically drained; during these times, the silt bed of the ponds brings back the feeding and resting environment formerly typical of the ancient alkaline mashes of the region.	LPA
	Mártély	The *Mártély LPA* is located on the left bank of the River Tisza, just opposite from the Pusztaszer LPA. Since its area falls within the floodplain of the River Tisza, the river's dynamically changing water levels play a primary role in shaping the natural condition, the fauna, and the flora of the area. There are two oxbow lakes within the protected area that have an exceptionally rich fauna and flora. Occasionally still connected to the River Tisza via smaller streams, some parts of these oxbows have already been filled up by sedimentation and have gone through eutrophisation.	LPA
	Tiszatelek–Tiszaberceli flood prone area	The *Tiszatelek–Tiszaberceli flood prone area NPA* is a mosaic of alluvial softwood and hardwood forests, stagnant backwaters, and grasslands.	*nature protection areas* (NPA)
	Bodrogszeg Castle Hill	The *Bodrogszeg Castle Hill NPA* is an island hill of rhyolite tufa covered by forests of dwarf downy oaks and, on its south slopes, grasslands abundant in wild flowers–a habitat of rare and endangered plant species.	NPA
	Tiszadob Floodplain	The *Tiszadob Floodplain NPA* is a varied, lush fabric of mostly old alluvial forest patches and oxbows. Its heron colony represents great value.	NPA
	Tiszadorogma Göbe Forest	The *Tiszadorogma Göbe Forest NPA* is a beautiful surviving stretch of the ancient alluvial forests that used to dominate vast areas. In addition to the birds typical of the habitat, it also has a flora rich in rare species.	NPA
	Tiszakürt Arboretum	The *Tiszakürt Arboretum NPA* is based on an arboretum whose creation started at the end of the 19th century within 17 ha of forest and marshland. Plane, linden, American oak, and various types of pine were planted among the oak, elm, and ash forming the original alluvial forests. In 2001, the arboretum – by then occupying as much as 60 ha – became a protected area of national importance.	NPA

	Kónyaszék of Csongrád	As far as the *Kónyaszék NPA of Csongrád* is concerned, here the region between the Rivers Danube and Tisza on the one hand, and the River Tisza itself of the other hand, have joined forces in shaping the landscape of dunes alternating with alkaline plains. This used to be a realm of vast expanses of shallow alkaline lakes of which Kónyaszék preserves the remnants. Consequently, this is the place to enjoy the real beauty and to experience all the typical characteristics of alkaline landscapes. In terms of its fauna, the region is home to the typical species of alkaline habitats, and especially to the nesting bird communities of this landscape. However, during the spring and fall migration periods – when the low plain is covered by a contiguous stretch of water –thousands of birds rest in Kónyaszék.	NPA

Table 10. Natural protected areas by country, in PiP3 area

Main problems regarding the management of the protected areas network in the corridor

As a general deficiency in ***Romania***, an integrated monitoring system is absent in the case of natural protected areas included in IUCN and Natura 2000 networks which lacks regulations regarding the zoning the sites hence leading to the inadequate management, determining the alteration of the conservation state of the objectives of protective interest for which Natura 2000 sites have been designed. The general problems which are frequently met are linked to the absence of signs and warning panels, favoring the infringement of the regime of protection and conservation, because few areas (those within the forest) have guards. The flooding of ecosystems in the low riverside floodplains leads to the temporary disturbance of existing habitats and the emergence of counter effects regarding water pollution, affecting the existing species. Terrestrial ecosystems recorded local imbalances due to forest clearings, as well as the execution of river bed arrangement/regulating works, not in line with the demands concerning the protection and conservation of biodiversity. The forest clearings determined the expansion of mountain grasslands (Igniş Mountains, Maramureş Mountains), transformed some forest areas into bushes or glades, often leading to the triggering of land erosion processes (area or lineal erosion) and the reduction of ecoproductive potential (Solovan Hill). The wild fauna has suffered a decrease in numbers in recent years due to unfavorable hydroclimatic conditions (harsh winters, great floods along the streams) and poaching. The fish fauna has been affected especially on Vişeu and Tisa rivers. The paths, constructions and campings are means of *ecosystem synanthropization* and entrance of allochthonous elements in the habitats. The presence of settlements, especially pastoral ones, led to a strong ruderalization of biotopes.

Ecological network

The ecological network comprises natural and semi-natural areas of national and regional importance as well as the biological interrelations maintained between them via ecological corridors. In most cases, the elements of the ecological network also include those specific areas located within the wider area of the ecological network that enjoy national or international protection.

The Hungarian ecological network is made up by three functional elements. The most valuable habitats of the network are the *core areas*. Connecting the core areas with one another either in a continuous way or, occasionally, with disruptions are chains of habitats called *ecological corridors*. The core areas and the elements of the ecological corridors are surrounded by *buffer zones* that not only provide physical protection but also, if possible, contain a relatively larger proportion of semi-natural habitats.

A review of those areas of the Upper Tisza section that form part of the national ecological network indicates that the most valuable semi-natural areas are found in the Szatmár–Bereg plain and in the Tokaj–Bodrogzug region. The Tokaj–Bodrogzug region has good ecological links towards the Zemplén Mountain in the north. These two valuable areas are sometimes only linked by the narrow flood prone area of the River Tisza. Located between two areas so rich in habitats, this section of the river is an area less well endowed in natural and semi-natural habitats and rather poor in horizontal links.

In terms of dimensions, those areas of the Middle Tisza section that form part of the national ecological network are among the most significant. Thanks to the relative proximity of the Lake Tisza, Hortobágy, and of the Borsod and Heves steppes along the right bank of the river, this section has many core areas that are connected to the floodplain of the River Tisza acting as an ecological corridor.
Moving towards the south along the Middle Tisza, the ratio of semi-natural areas starts to decrease as intensive agriculture expands dynamically because of improving soil quality.

Strictly in terms of dimensions, those areas of the Lower Tisza section that form part of the national ecological network are among the least significant. Thanks to the high ratio of good quality soils, a significant part of this area is under agricultural cultivation. The natural and semi-natural habitats have withdrawn to a small number of alkaline, marshy spots and to the floodplains of the River Tisza and its tributaries. Yet these surviving patches of habitat are core areas of great value within the ecological network. The primary ecological links between them are the alluvial strips along the rivers. The horizontal links between the core areas that are further away from the rivers are weak and scarce.

	Strenghts	Weaknesses	Opportunities	Threats
Romania	- 5 protected areas of national interest and four Natura 2000 sites; - Some nature reserves are in very good condition, unaffected by any activity but the traditional ones (which do not alter the natural evolution state); - Grazing in subalpine gaps is no longer a pressure on wildlife, as sheepfolds number is constantly decreasing; - The state of aquatic habitats outside protected areas and Natura 2000 sites is generally good, due to reduced pollution on the rivers; - Low economic diversification in terms of productive activities; - Orientation towards economic sectors whose products have a low gross value added; - Dependence on local resources and weak integration into the productive processes of allochthonous material; - Low share of arable lands; - Low share of complex cultures, even if they are everywhere due to fragmentation of parcels; - Low productivity of arable land due to less favorable physical and geographical conditions;	- Relatively high number of parcels of farmland are abandoned; - Inadequate management of Natura 2000 sites; - Only forest areas are guarded; - Lack of markings and warning panels, favoring breach of the protection and conservation rules; - Trails, buildings, campsites are means synanthropization of ecosystems and penetration of allochthonous elements in habitats; - Insufficient research studies and data gathering activities in most protected areas; - Lack of public awareness activities on the importance of forests; - Degradation of trees in "Coştiui Larch Forest " Reservation; - Degraded habitats in the floodplain of the river Tisza and tributary Iza.	- The concepts of ecological agriculture and bio-farming could allow these kinds of landuse without degradation of the environment; - Sanitization of the noncompliant landfills using European funds.	- Lack of regulation for Natura 2000 sites; - Irresponsible practice of tourism; - Poaching; - Lack of integrated monitoring system of protected areas in Natura 2000 and IUCN networks; - Significant deforestation, near centers of industrial wood processing; - Execution of regularization of river beds; - Flooding of river ecosystems in the lower meadows; - Unfavorable hidroclimatic conditions (very hard winters, large floods on the rivers); - Uncontrolled waste disposal in the flood prone area and on the riverbeds and banks, especially household waste and sawdust.
Ukraine	- High share of forest lands in the total area of the region; - High share of nature protected areas within the target area;	- Agriculture is complicated in mountainous areas with relief and negative geological processes and on flat areas – with high level of ground water; - Ecological network is just worked up at present.	- Possibility of close international collaboration in the fields of nature protection and land use optimization with Romania, Hungary and Slovakia.	- Intensive and non-sustainable development of tourism might cause degradation of natural values.

Slovakia	- High share of nature protected;	- Extensive agricultural activities in the area. - High share of arable land.	- Support of non-agriculture activities; - Possibility of close international collaboration in the fields of nature protection and land use optimization with Romania, Hungary and Slovakia.	- Lack of funds and investments.
Hungary	- High share of national and international level protected area; - Tisza related habitats and endemic species.	- Relatively high share of intensively farmed area; - Low share of natural and native forest area.	- Availability of EU and national resources ; - Changing flood protection paradigm	- The flood prone area is highly exposed to disturbing factors; - Aggressive spreading of invasive woody and herbaceous plant species; - Deterioration of habitat; - Different sectoral interests in landuse structure of the flood prone area.
Serbia	- High share of natural protected areas.	- Low share of forest areas; - High share of agricultural areas	- Forming the ecological network.	- Intensive and non-sustainable development might cause degradation of natural values.

Table 11. SWOT analysis on Land Use and Protected Areas in PiP3 area

Tourism

The River Tisa and its immediate environment, even in its present form, is among those European rivers that preserve their most natural state. Its unparalleled natural beauty, cultural landscapes, and ecological treasures grant its outstanding importance for the biosphere and biodiversity of the entire Carpathian Basin. Presenting these values of nature by giving preference to ecotourism and by the simultaneous development of other touristic attractions and background infrastructure, both nationally and internationally, would generate further economic advantages. The objective is to cooperate with the neighbouring countries in promoting a form of complex and harmonised sustainable tourism along the River Tisa that, first and foremost, takes full account of the specificities of the river region. The very basis of this sustainability should be a well-considered and dedicated effort to develop what could be a combination of the soft forms of green and ecological tourism and the preservation of the River Tisa seen not only as a rich landscape but also as a vehicle of our shared natural, spiritual, and cultural heritage.

On **Romanian** territory, Tisa ecological corridor stands out due to a complex natural and anthropogenic tourism potential, which became a premises for tourism development and primary tourism supply.

In **Ukraine**, the administrative and cultural centres of NUTS4 units through which Tisa is running are mostly located within the PiP3 target area. That's why the area is rich with touristic attractions, possesses better developed tourist infrastructure and economically is more stable then Zakarpatska Oblast in total.

In **Slovakia**, the target area is part of the Medzibodrožie Region from the geographical and historical point of view. Due to this fact it is not possible to evaluate the potential of the villages Malé Trakany and Veľké Trakany for tourism without connection with other villages of this region.

In **Hungary,** the River Tisza does not play an outstanding role in tourism and it underperforms as compared to the potentials it has. Neither does it play a prime role in the tourist life of its immediate environment, a strip of 162 settlements located along both banks of the river. The River Tisza has lost its significance as an axis of the development and spatial structure of the Great Plain. Except for the river crossing points, which continue to be important, the River Tisza has become more of a boundary than a connecting link both horizontally and, in fact, vertically. In addition, the current public administration borders (those of the settlements, micro-regions, and counties) frequently run along the river, which is a marked disadvantage for the settlements along the River Tisza when it comes to development projects, among other things. Except for the Lake Tisa Tourism Region, Hungary's regions of tourism mirror the layout of its statistical regions. The River Tisza does not exist as an independent tourism region, and it has difficulties even asserting itself as a tourist destination in its own right. There are few settlements even on the very bank of the river in whose tourism the river plays an exclusive or even outstanding role. The attractiveness of the large and medium-sized cities is based on their ***architectural heritage*** and their cultural events, and, occasionally, on their ***thermal spas***. In some small settlements, ***water sports tourism*** by now has become a central theme of the tourist's experience; however, because of the underdeveloped infrastructural background and the

weather-dependent, seasonally limited summer turnover peaks, it has not yet generated the expected revenue levels.

> *The river and its environment have seen significant changes over the one and a half centuries that passed since the time of river regulation. The cutting through of meanders has induced land use changes that mostly put an end to the traditional organic coexistence between the river and the society of the settlements along the river banks. Alluvial orchards, fishing and watermills all disappeared along with the whole local economy based on the management of the inlets and outlets of the oxbow lakes, a world entirely unknown to visiting tourists whether they arrive from abroad or from within the country. Today, a reconstructed farm, an exhibition venue, or a local fair of the region's specialty products may be a great addition to whatever is on offer for fans of* ***gastro tourism*** *and* ***village tourism****.*
>
> *During the 20th century, agriculture gradually lost much of its ability to sustain the population. As time passed, its network infrastructure lagged behind more and more even in comparison to the low average of the Hungarian Great Plain. In turn, the hazard of floods and excess water gradually increased, along with a slow degrading of the fauna and the flora of the semi-natural areas affected. The settlements are less than viable and their economy is unbalanced, and the condition of their natural environment (in terms of waste management and sewage network connection) still leaves much room for development. These disadvantages were most devastating for those settlements where the availability of social (human) resources and economic resources (capital reserves) was limited. Many small settlements became marginalised, a process not conducive to a flourishing tourism industry in the context of general economic development. Disorderly settlements,* ***the lack of permanent infrastructure catering for tourists****, and poor public safety do not tend to attract visitors. The implementation of tourism development projects also lags behind the potentials of the region simply because these show the lowest level of activity in generating project proposals mostly because of the lack of own resources.*

The entire length of the Hungarian section of the river from Tizsabecs to Szeged is too diverse in terms of its regional features to receive the same treatment in a study like this: it cannot be identified as a more or less homogenous strip of settlements along the River Tisza that is characterised by the same features along its entire length.

Accordingly, when discussing the properties of the area in the context of tourism, it is advisable to talk about at least three separate sections:

- *Upper section: from the Ukrainian border to Tokaj*
- *Middle section: from Tokaj to Szolnok*
- *Lower section: from Szolnok to the Serbian border*

In **Serbia**, the most important tourist destination, with the greatest number of arrivals and overnight stays in the Pilot Project Area are: Bečej (South Bačka district), Zrenjanin in Srednji Banat district and Kanjiža Spa in Severni Banat district. These destinations represent important receptive markets that have developed or could develop and improve the business and MICE tourism, spa tourism, special interest tourism, rural tourism and cultural tourism.

- **Touristic attractions**

Environmental attractions

Romania

The tourism morphological potential stands out predominantly due to the quality of the **landscapes**, following the general lines of the two mountain units bordering Tisa corridor to the East (Maramureş Mountains) and to the West (Gutâi-Igniş Mountains). As a result, there are different conditions in which the morphology includes volcanic cones and plateaus, steep or massive slopes (towards Săpânța village, Stânca Custurii), waterfalls (Covătari/Runcu and Izvoru Runcului, Criva valley waterfalls, Tomnatic valley waterfall and Criva waterfall), foothills, extended and fragmented glacises, watershed, small basins and clearly outlined valley corridors (Săpânța Gorges and those of its tributaries – Mireş and Runc).

In the Romanian sector, areas that might be used for the practice of winter sports (ski for leisure) can be identified:

- ✓ in **Maramureş Mountains**, near the mountain summits of Pop Ivan, Tomnatecu and Farcău-Mihailecu, with a favourable altitudinal distribution of slopes between 700 and 1700m and an orientation predominantly towards North, North-East and North-West, with a lower degree of accessibility;
- ✓ **the Northern area of Igniş Mountains** includes two areas situated at heights between 700 and 1200m (*Ţiganu-Agriş area and the upper catchment area of Săpânța River*), with a northern and north-eastern exposure, a snow cover duration of 4-5 months per year and rather low accessibility conditions.

The climatic and bioclimatic potential *specific for Tisa corridor* is characteristic for the climate of hills and basins located heights between 200 and 800m. It is favourable for all categories of people, as it is a sedative-indifferent bioclimate, with relatively moderate bioclimatic indices throughout the whole year. In the *marginal sectors (western and eastern ones) corresponding to the mountain area of Gutâi-Igniş and Pop Ivan part of Maramureş Mountains*, there is a tonic stimulative mountain bioclimate. The main elements defining the bioclimate specific for the area have the following values: the temperature between 7 and 8,5degrees C at the foot of the mountains, gradually decreasing as the altitude increases, high mean annual precipitation (increasing from 850mm in the basin and corridor area to more than 1000mm and even 1200mm on the highest ranges of the marginal mountain space), a high relative air humidity all along the year, a high frequency of winter meteorological phenomena (at least eight months per year and the snow cover is maintained for about 5 months), relatively high wind speed (more than 10m/s). For the practice of air therapy and heliotherapy, *the number of days with thermal comfort* is a little more than 10 days in July, while *the number of days with thermal discomfort due to the heat*, in the same month, is rather high. The number of days with discomfort due to chilling varies between 3-4 days in the corridor area to more than 15 days in the mountain areas.

The hydrogeographical tourism potential is relatively diversified. *The river network* is represented by Tisa and its tributaries: Vişeu, Iza and Săpânța. Their impact on tourism is low. In Săpânța Gorges there are waterfalls (Şipote, Mireş, Covătari and Izvoru Runcului) and there are waterfalls also in Tisa Gorges. *The hydromineral resources*, adequate for their planning and capitalization for curative and leisure purposes, are found within the territory of Săpânța and Coştiui settlements, due to the presence of salt deposits (salty-sulphurous-bicarbonated

waters). Added to these, on the territory of Săpânța settlement, there are bicarbonate, sodic, calcic and chlorous springs, while within Bocicoiu Mare commune (Crăciuneşti village), there is a mineral spring belonging to the chlorous-bicarbonated-sulphurous hydrochemical type, with a low mineralization (1,75g/l). *The lakes* stand out both for their therapeutical value (the concentrated salt lakes) and for their esthetic and landscape component and their fish fauna. One of the *natural lakes with landscape tourism attractiveness* is Vinderelul periglacial lake in Maramureş Mountains and the lake formed by a landslide at Coştiui (about to be silted-up). The only *anthropogenic lake* is the one at Teplița, which is in a state of degradation at the moment.

Within the analysed territory, there are a series of *marshes and peat bogs* (either oligotrophic, eutrophic or mesotrophic). Their diversity of floristic species may attract the people practicing scientific tourism: Jilărescu, Medveş, Mireş and Coltibi marshes, Tribşor peat bogs (a total of three), Poiana Săpânței, Poiana Runcului, Vrăticel peat bog, „La Mlăci" marshes (all within Săpânța administrative territory), cu Rini peat bog, Tăul „La Ier" Lake, the marshes under „Strunga Țiganului", Tăul Negru Lake, Tăul Rusului Lake, the lake on Solovan Hill (all within the administrative territory of Sighetu Marmației City), the moor near Mohelca (on Bocicoiu Mare territory) etc.

The biogeographical and faunistic tourism potential is represented by the forest ecosystem, including specific biocenoses. There are three areas which stand out as they benefit of a protection status: Poiana Brazilor Marsh Reserve (within the commune of Săpânța, covering 3ha, the lowest station – 970m – for *Pinus mugo* in Romania), Ronişoara Sessile Oak Forest (Rona de Sus commune, covering an area of 62ha, providing shelter to 200 year old trees and having a leisure role for tourists at Coştiui) and Coştiui Larch Forest (extended over 0,7ha). One should highlight the practice of *cynegetic tourism*. The most important species of cynegetic interest are bear, red deer, roe deer, wild boar, hare, lynx, wild cat, fox, wolf, pheasant, partridge, marten etc.

Ukraine

The target area has a huge sanative-and-recreational and tourist potential and occupies one of leading places in Ukraine. The main recreational resources of the region include its climate, therapeutic muds and brine of lakes, mineral waters, forest resources, water bodies, landscape peculiarities of the territory for rest and tourism for a full year.

In the Eastern part of the target area in Rakhivskyi Region there is the highest point in the territory of Ukraine – Hoverla Mountain (its height is 2061meters above the sea level). It is a significant object of pilgrimage. Also a very important pilgrimage places are Tisa River start point and the centre of continental Europe identified by austrian-hungarian experts in 1887 both also in Rakhivskyi Region.

The area is famous for its healing mineral waters, which differ in chemical, thermal and gas composition (there are about 30 types). The salt lakes of Solotvyno are of balneological importance. The healing properties of brine and therapeutic muds of lakes attract thousands of tourists in summer. Scientific research showed that the water of the lakes belongs by its composition to bromine chlorine-sodium sub-thermal weak-acid brines total mineralization of which varies from 73g/l to 275g/l and that is why it is very close to the mineralization of the Israeli Dead Sea. The present-day research and previous experience show that brine and salt of the lake can be efficiently used for mud treatment, balneotherapy (brine baths),

thalassotherapy of the people with the diseases of musculoskeletal system, peripheral nervous system, skin, especially psoriasis, and gynaecological diseases.

Unique natural formations of the region – lakes, waterfalls, scenic ridges and weird rocks are popular among tourists. In particular, Nireshskyi waterfall near the city of Khust, the highest in Zakarpatska Oblast Trofanec waterfall on the hills of Blyznycia Mountain near settlement Yasynia, Narcissus Valley near Vynohradiv city are well-known places of pilgrimage of tourists from various corners of Ukraine and from abroad.

There are no natural caves within the target area, but in Rakhivskyi Region near Dilove village there are human-made caves Dovhorunia and Cheremshyna, which are especially interested by their vertical sides. Also in Tiachivskyi Region in Solotvyno there are salt mines which now are used for respiratory tracts treating.

Slovakia

The Medzibodrožie Region is a true island of tranquillity surrounded by three rivers – the Tisa, the Bodrog and the Latorica, connected with the surrounding area of the Slovak Republic only by several bridges, while this area is of a highly specific character, strong identity and wide and specific offer for tourists.

There are two national natural reserves in the Medzibodrožie Region (Botiansky luh, Latorický luh), ten natural reserves, Protected Landscape Area Latorica is also outreaching there, protected birds area Medzibodrožie, several NATURA 2000 areas (Latorica, Tarbucka, Veľký Kopec, Horeš meadows), or Ramsar sites.

There are many other attractive activities for tourists, such as boat rides on the rivers or romantic corners of numerous dead channel of lakes in floodplain forest, swimming, tasting of local fish specialities or local wines in numerous old tuff wine cellars, a visit to the Premonstratesian manor house in Leles, preserved manor houses (Manor house of Francis Rákóczy II. in Borša, Manor house of the Majláths in Pribeník, Manor house of the Vécseys in Streda nad Bodrogom) and ruins of the castles (Csonkavár near Kráľovský Chlmec, Kamenecký castle near Veľký Kamenec), horse riding, cycling along the river banks or work of local carvers.

The target area has a potential for the development of tourism due to several unique natural, cultural or historical preconditions.

The crucial localization factor from the point of natural conditions for the attractiveness of the area is primarily the Tisa River, whose 5km long section is the border with Hungary. The current river bed passes through floodplain forests or is lined by willows. The river itself is navigable and provides very good opportunities for rafting and other water sports using canoe or kayak. There is also the original bed of the Tisa River in the area, which is now a disconnected tributary called “the Old Tisa” and there is also network of wetlands known as “the Tice“. In the village Malé Trakany the bank of the Tisa River is lined by sand beaches, formed by fine alluvial river sand – “the Tisa Golden Sands “ offering opportunities for swimming in natural conditions. The locality is approachable by a path from the village Malé Trakany. Because the sandy beach “the Tisa Golden Sands “ is situated in inundation area of the river, the potential of its use is limited only for the period of favourable water level conditions of the river.

Hungary

The strip of settlements along the Upper Tisza

It forms part of the Northern Great Plain region and Szabolcs-Szatmár Bereg County from Tiszabecs to Záhony, and lies along the border between the North Hungary region and the Northern Great Plain region from Záhony to Tokaj. For now, the area is still somewhat difficult to reach from the capital as the high-speed roads M3 and M30 pass it by instead of opening it up. As a result, it is not a typical destination for day trips with a Budapest starting point. Typically, its visitors are either Hungarian citizens staying for longer periods of time or tourists from the neighbouring countries, mostly Slovakia.

The major attractions of the area are the proximity of the River Tisza and its natural environment, the landscapes of the Beregi-Tiszahát and Bodrogköz, the protected natural areas, and the cultural heritage of the settlements. The historical wine region of Tokaj-hegyalja is a World Heritage site.

The region is rich in *health and thermal spas*. Most of the natural areas do not have sufficient infrastructure to receive tourists, and both the area's turnover and its competitiveness are limited by the lack of a clear marketing strategy. The River Tisa and its oxbow lakes offer great opportunities for *water sports tourism*; however, the necessary infrastructure is not fully available. There are not enough river ports within in the region. Having more ports would be an essential requirement for river boat trips and for motor boat or yacht tourism. The meanders cut off when the river was regulated and turned into oxbow lakes, along with the natural and artificial lakes and channels, offer significant opportunities for angling. Still within active tourism, the region has a great potential not only for water sports tourism but also for *bicycle tourism*. The existence of the international EuroVelo bicycle path network, the terrain, the fact that altitude differences are very limited, and that the roads, dikes and embankments involved have a very limited traffic are all factors that make it possible to expand the potentials of bicycle tourism in the region. The area along the River Tisza has a rich game population, especially as far as small game is concerned. There are many certified *equestrian establishments* in the region; however, cooperation between the equestrian farms and centres is not ideal. There are no designated horse riding tracks connecting the equestrian establishments of the region, and there are no guaranteed programs.

The strip of settlements along the Middle Tisa

the northern part:

It forms part of the Lake Tisa Tourism Region, which in turn is bordered by the Northern Great Plain region from the south and by the North Hungary region from the north. It is distributed between four counties (Borsod-Abaúj-Zemplén, Hajdú-Bihar, Heves and Jász-Nagykun-Szolnok). Thanks to Motorway M3, Lake Tisa is at a reasonable driving distance from Budapest but the region's local roads are of rather poor quality

Over the past 10 years, the region has seen the opening of modern accommodation establishments offering new types of well-equipped accommodation to tourists. Total accommodation capacity still needs to be somewhat expanded, with more focus on upgrading the quality of the existing services. With a view to the individual target groups, existing accommodation service providers must expand their range of special complementary services. Many water tour and bicycle aficionados, young people, and anglers have a preference for, and in fact seek, nomadic (and affordable) forms of accommodation. Every settlement within the region has a range of catering services from simple refreshment stalls to restaurants. However, most of the establishments do not live up to the expected quality standards. The

overall appearance of the settlements along the river banks and lake shores within the region has gone through a significant change over the past decades (since the development of Lake Tisza) primarily as a response to growing tourism. New resort establishments have been built, and the settlements have renovated and remodelled their village and city centres.
Currently, the environmental condition of the Lake Tisa region is fairly good. However, tourism development is itself a threat to the environment of Lake Tisa as most of the region's tourism is based on the lake. In order to ensure sustainability, taking good care of the environment is in the best interest of all the parties involved. In terms of human resources, the Lake Tisa Tourism Region is one of the most underdeveloped areas of the country.

The most important features of the Lake Tisa region in terms of tourism are Lake Tisa itself and the 120rkm section of the River Tisa that passes through the region. Accordingly, the very backbone of tourism within this region is a selection of forms of tourism tied to the elements of water, river banks, and aquatic habitats. The most outstanding attraction in the Lake Tisa region is *ecotourism*, which has become one of the flagship products of the region over the past few years. The region was the first to be awarded Village+ certification in Europe. In certain settlements mostly located along the Lake Tisza, forms of active tourism taking place *in or on the water or on the beach* play a similarly important role. Additional touristic elements include *health and thermal tourism*.

the southern part:
Is dominated by the city of Szolnok as a centre. It is the settlement with the largest turnover of guests along the Middle Tisa.

The settlements around it do not have any classic sights to attract tourists; however, the relatively unpolluted natural environment, the semi-natural condition of river banks and stagnant waters, and the presence of significant medicinal and thermal water sources may serve as a basis for developing tourism. This is especially true for hunting, angling, water sports tourism, equestrian tourism, and bicycle tourism. The river valley, the oxbow lakes, and the channels still preserve their natural condition and form important green corridors even in the European context; however, the development of ecotourism and water sports tourism still has a long way ahead of it. The oxbow lakes are ideal primarily for angling tourists, while the protected natural areas are a preferred target for nature lovers, excursionists, and naturalists. The medicinal silt of Kolop available for extraction near Tiszasüly is a unique treasure. The protected areas are overseen by Hortobágy National Park and by Körös-Maros National Park.

The strip of settlements along the Lower Tisa:
South of Szolnok, the River Tisza widens and its hydrological character also changes. Assuming the traits of a typical flatland river, it rolls past settlements of more extended spatial parameters and larger populations, which means that it rarely passes by the central areas of settlements any longer. The region is easier to access from the north or from the south than from an east-west direction because there are relatively few bridges across the River Tisza. Because of the proximity of the border, the area also has transit functions.

What make the Southern Great Plain section of the area unique are the wide river, its gallery forests, its cut-off meanders and oxbow lakes, and–as we move further away from it–the alkaline grasslands, the alkaline lakes, the fishponds, and the characteristic solitary farm houses. This section is exceptionally rich in thermal and medicinal waters. All these factors would allow making more use of the region in the context of *active and health tourism* (Csongrád, Szentes, Hódmezovásárhely, and Szeged). This is Hungary's sunniest region, a

circumstance that creates ideal conditions for all types of leisure activities, be it water sports tourism, hiking, bicycle tourism, equestrian tourism, hunting, angling or ecotourism.

Serbia

Spa tourism

The area is characterized by significantly spa tourism sites. The most distinctive ones are banja Kanjiža and Bečejska banja. It is particularly important that they differentiate the offer and physically separated facilities for medical treatment visitors and for tourist visitors.

On the Tisa riverbanks, there are a few mineral water sources, which are used in spas for treatment. There are several mineral water sources that have not yet been tapped, and their exploitation is expected. Those sources are in the municipalities of Senta, Coka and Ada.

Hunting and fishing tourism

Hunting and fishing are certainly important activities in terms of tourist attractions. While hunting sector in Vojvodina has been devastating last two decades, fishing tourism have developed by opening the mostly private-controlled and fully equipped fishing grounds.

Nautical tourism

Development of boating and nautical tourism in the Tisa River has not yet begun. There are only the natural resources on which it appeared Tourism Strategy of Serbia 2005-2015.

Nautical seson on Tisa can last from April till October. Nautical season, therefore, unlike of cure, lasts much longer, which is a possible extension from the summer season to the spring and autumn. It is necessary to point out that in the spring and autumn Tisa has far more water than in the summer so the sailing is safer and much more pleasant.

<u>Built and cultural attractions</u>

Romania

The anthropogenic tourism potential, in terms of variety and value, is directly linked to the long evolution of human civilisation and the interferences between the ethnical mixture and the specific cultures of diverse nationalities dwelling within this space (Ukrainians, Hungarians, Germans and, in the past, Jews).

a) **The cultural-historical tourism heritage** represents the most valuable component of the entire anthropogenic heritage. The ancient habitation of the territory is proved by the **archaeological traces** found at Sighetu Marmației, Sarasău and Crăciuneşti.

b) **The religious and historical-cultural tourist attractions** within the analysed territory belong to different historical ages, to multiple categories and are the result of a complex and tumultuous social-historical and political evolution, to which the autochthonous and allochthonous human communities contributed in different manners.

   A category that is well represented at the scale of the analysed territory is that of **buildings meant for dwelling**, such as *castles, manors and houses*, usually located in strategic sites. Even today, they stand out due to their architecture, massiveness, position, different collections, as in the case of Szaploncsay Zoltan manor (Tisa), Apaffi castle (Coştiui), the houses of Sarasău (Mihaly House, Iurca House and Man House).

The historical centre of Sighetu Marmației City, covering a very large area of the old town (about 2500 ha), outlines the most ancient urban core, which evolved around the Liberty Square and the adjoining streets. *The civil attractions, the old buildings having administrative or cultural functions* (the former prison, the old court, Albina Bank, Maramureş Bank, National Bank, the town hall, the military barracks, the railway station, the post office etc) or the *residential houses* belonging to merchant families or important people of the town represent true monuments of architecture.

The museums are represented by Maramureş Land Museum (Sighetu Marmației), Maramureş Ethnographic Museum, Memorial Museum of the Victims of Communism and of Resistance, Museum of Jewish Culture and Civilisation, History Museum, Ioan Mihaly de Apşa Museum House (1880). Added to these, one may mention the *Jewish cemeteries* of Săpânța and Sighetu Marmației and especially the Merry Cemetery of Săpânța.

The religious buildings (churches) have their largest dissemination area within Sighetu Marmației City. They are also found in practically all the settlements within Tisa ecological corridor. There are Orthodox, Latin Catholic, Greek Catholic, Protestant and Jewish churches. The **monasteries** are present at Săpânța-Peri and Rona de Sus. A peculiarity of this area is the presence of *wooden churches*, located at Săpânța, Bistra and Rona de Jos.

c) The tourism heritage related to the rural traditional culture and civilisation is preserved in a state close to the original one. One may mention the following true **tourism brands**:

- The Merry Cemetery of Săpânța, included on the list of UNESCO World Heritage sites;
- The wooden church of Săpânța-Peri Monastery (Săpânța), considered the tallest wooden church in Europe (75m);
- *The ancient wooden churches* (Săpânța, Bistra and Rona de Jos);
- Maramureş Village Museum (Sighetu Marmației);
- *The traditional wooden gates*, built on 3, 5 or 6 richly adorned pillars, covered with wooden shingle roof (Săpânța);
- *The architecture of wooden houses*;
- *Maramureş folk costume*, with specific clothing items (the striped woolen skirts of the women's costume, with inserted horizontal stripes, most frequently coloured in red and black or yellow and black, sheepskin coats, singlets, vests, caps, hats) etc.;
- *The traditional folk music*, highly rhythmic, performed by an orchestra made up by three instrumentalists: ceteraş (violinist), zongurar (guitar player, using the guitar in an oblique position) and dobaş (drummer);
- *The traditional crafts,* represented by glass icon painting, wood carving, weaving by means of a loom, hat making, traditional shirt weaving, traditional pottery and sculpture (Sighetu Marmației), textile products processing and wool counterpane manufacturing (Săpânța), manufacture of crosses of Săpânța Merry Cemetery type etc;
- *Peasant technical equipments* (mills, whirlpools, fulling mills, threshing machines and saw mills - on Săpânța Valley and its tributaries);

Cultural events: the National Festival of Winter Customs (Sighetu Marmației), Sheep Milking (Bistra), Ukrainian National Cultural Event (Bocicoiu Mare), different autumn Ukrainian customs (Remeți), the „Midsummer Day Event" and „Singing, dancing and entertainment" on Ronişoara Valley (Rona de Jos).

Ukraine

There is an ancient castle in Vyshkovo village in Khustskyi Region. In Vynohradiv and in Khust there are ruins of ancient castles.

The wooden churches unique in their own way built by national masters without a single nail, in the specific architectural styles inherent in only a certain district, are the pride of the Trans-Carpathians. Five styles are distinguished in the architecture of the Trans-Carpathian churches: Lemki, Boyki, Huzul, Baroque and Gothic. Terms "Baroque", "Gothic" are conditional as it is not a question of classical European styles, but only of the organic mastering by the Ukrainian architecture of certain elements of these styles. Works of many authors caused that the Ukrainian wooden church architecture has became known in the world as an original and unique phenomenon. In negotiations with experts of the World Heritage Center, an idea has ripened to enter small group of wooden churches of the Carpathian region of the Western Ukraine into the List of UNESCO Monuments. St. Parasceva's Church in Aleksandrivka (the early XVIII century) and St. Nicholas church in Svalyava (the XVIIth century) in the Trans-Carpathian Oblast have been advised in this list in the form of a preliminary representation. The university in Bamberg (Germany) has given an individual grant on measurements and research of the temples in the Western Ukraine to a Ukrainian architect.

Slovakia

There are the following historical and cultural attractions in the target area:

In the village Veľké Trakany:

- Salt Office Building – museum of salt road on the Tisa. Late baroque building dating back to the first half of the 18th century is situated above the bed of detached arm of the Tisa River. There was originally situated a port for ships and wooden rafts carrying salt from the Eastern Carpathians. After the reconstruction completed in 2005 there was opened regional history museum. It offers topographic historic display, exhibition of horn carvings and display of history of carrying salt from Romania and Ukraine (salt mines in Maramures area) along the Tisa River to the centre of the Austro-Hungarian Empire. Cultural and social events are organized in this building.
- Roman Catholic Church – decorated with frescoes, built on the foundations of the original castle chapel in 1894.
- Evangelical Church built in the first half of the 20th century.
- The foundations of the original castle and a well preserved park.

In the village Malé Trakany:

- Reformed Classical Church build in 1772 with the bust of Arpád – leader of Old Hungarians dating back to the end of the 9th century, which proves that one of their first settlement localities was Medzibodrožie,
- The Crucifix in front of the local cemetery built in 1905, which was financially supported by the local emigrants to the USA. It was blessed again in 2006 to commemorate these people.

The village Veľké Trakany and especially the Salt Office building – museum of salt road on the Tisa are part of the program offered for tourists by the Bodrogtour Information Centre in Kráľovský Chlmec.

Hungary

The strip of settlements along the Upper Tisza

The watermill of Túristvándi and the dry mill of Tarpa, operated by animal power, are unique sites of European technological history. There are a great number of castles and mansions in the region; some are taken commercial advantage of, others are not (Tiszadob, a former castle of the Andrássy family; Lónya).

The area has a lot to offer in terms of *gastronomy*. Local specialties include fisherman's soup–a fare typical of the River Tisza region–and a variety of dishes traditionally made by local herdsmen such as *slambuc*, a savoury noodle dish, or *goulash*, a rich stew, both made outdoors in kettles over an open fire. In many settlements of the region, traditional festivals and local events attract tourists throughout the year. The offer often comes complete with opportunities for village tourism.

The strip of settlements along the Middle Tisa

In the *the northern part:* village tourism, cultural tourism, and business and conference tourism. Local attractions (equestrian tourism, hunting tourism, gastro tourism, and heritage tourism) may not be of a key importance on their own but they are an important addition to the range of services offered and may complement the flagship products.

The strip of settlements along the Lower Tisa:

The settlements of the region are shaped by the amalgamation of different cultures, with the pronounced presence of national minority cultures. The region offers additional tourist attractions as well: famous sights, treasures of the country's cultural heritage, hiking tracks, and attractive programmes. However, often there is a shortage of regional and/or complex program packages. Village and farm tourism are popular with families, groups of adults, and groups of students. Of all the settlements of this section –but in fact, all over the length of the entire Hungarian section of the River Tisa– the city of Szeged is the uncontested leader in all branches of tourism. Business and conference tourism are also significant in Szeged, which, besides being the cultural seat of the Southern Great Plain, also has a unique landscape and an appealing urban character.

Serbia

Archaeological sites in the Pilot Project Area are from different periods, the most from the prehistoric, paleolit and bronze age. The largest number of archeological sites is located in the South Backa County, while those in Severnobanatski and Srednjebanatski are mostly unexplored, and unfinished as tourist sites.

NUTS 3	LAU1	Site
Južnobački	Titel	**Kalvarija - Titelsko plato**, Cultural monument of great importance
Srednjebanatski	Novi Bečej	**Matejski brod**, Cultural monument of great importance

Table 12. Locations of archaeological sites in the territory of the Counties in Pilot Project Area, with the status of cultural monuments of great importance

County	Municipality-LAU1	Site
Južnobački	Bečej	**Prevodnica „Šlajz"**
Južnobački	Titel	**Crkva velikomučenika Stefana Dečanskog u Vilovu**
Južnobački	Žabalj	**Srpska pravoslavna crkva u Čurugu**
Severnobanatski	Kikinda	**Pravoslavna crkva u Kikindi**
Severnobanatski	Kikinda	**Suvača u Kikindi**
Severnobanatski	Kikinda	**Pravoslavna crkva u Mokrinu**,
Severnobanatski	Novi Bečej	**Arača u Novom Bečeju**,
Severnobanatski	Čoka	**Rimokatolička crkva u Čoki**,
Severnobanatski	Kikinda	**Pravoslavna crkva u Kikindi**
Severnobanatski	Senta	**Mesto bitke kod Sente 1697**.

Table 13. Overview of cultural heritage of extraordinary importance in the Pilot Project Area

Events and festivals are numerous, both traditional and contemporary, but there is evident lack of clear strategy. One event is directly connected to the Tisa river ("Cvetanje Tise"), while others are related to settlements of the area.

Churches and chapels are numerous. They belong to different religions and confesions. They are material evidence of cultural and ethnic diversity. Institutions like museums, galleries and theaters are typical for larger cities, while the organization of cultural activities in smaller towns is in charge of cultural centers.

Rural tourism

Rural tourism can be placed in the fourth place, as tourism sector which recently experienced an expansion. Farms are located along major travel corridors and roads, and mostly rely on weekend trips and transit tourism. The existence of these sites significantly stimulates circular tours, a significant segment of the tourist offer of Vojvodina. In Potisje there are many attractive properties put in the function of rural tourism.

Business and MICE Tourism *(Meetings, Incentives, Conferencing, Exhibitions)*

Business tourism is characteristic of large cities, as well as segments of MICE tourism. This segment of tourism is well developed in Zrenjanin, but also other smaller towns, can with additional facilities, to offer tourists an adequate program for the meetings, incentives, conferences and exhibitions organized.

Sport and leisure activities

In Project area is a fairly large number of objects and content for rest and recreation. It could be said that the biggest problem is that the objects are mostly in poor condition and which is underused, as well as accommodation facilities. And the causes are the same: the lack of attractive programs to attract tourists, or lack of strategy of development of tourism and leisure activity for the locals. As for the spatial location of these facilities, they are mostly in urban centers, which suggest that they were constructed for the local population so that almost are not actively involved in a tourist industry. On the other hand, their spatial distribution is uneven, and probably the result of the ambition of local administration and the ability to at some point provide funds for their construction.

- **Recreational facilities**

Analyzing the available tourism indicators, it can be noticed that on a local level (NUTS 5 in Hungary and Romania) there is a decrease both in hosting capacity and in nights spent by tourists in the area; on the other hand, on a regional level (NUTS 4 in Ukarine and Slovakia), there is an increase for the same indicators.

Romania

The analysis of the spatial distribution of the number of beds in rural guesthouses at the level of Maramureş Land region reveals the fact that the studied territory is part of the area which concentrates the highest number of **guesthouses**, corresponding to the middle and lower Iza, between Ieud and Săpânța. In 2009, at the level of the analysed space, the accommodation capacity is rather low (decreasing in comparison to previous years), unable to attract a high number of tourists in the key-moments of the season and during tourism events. In effect, out of the 34 rural guesthouses registered in 2007 (having 191 beds), only 20 were officially registered in 2009, supplying a number of 126 accommodation beds, grouped in a different manner at the level of settlements, as Săpânța and Rona de Jos are the favorite locations.

The accommodation capacity provided by rural guesthouses is supplemented by **other accommodation units** (hotel, hostel, motel, villa etc), located in Sighetu Marmației City and settlements which benefit of bathing resources, supplying the *transit tourism*.

The **rural tourism** activity is performed by means of initiatives started by the first foreign associations interested in supporting the Romanian rural areas, using models from their countries of origin. The *MTMM Network* (established in 2003-2004, by the Association „Maramureş Land social-economic development microregion) groups guesthouses of the villages of Săpânța, Câmpulung la Tisa, Rona de Jos, Fereşti, Giuleşti, Ocna Şugatag, Budeşti, Sârbi, Bârsana, Săcel and Moisei. Within *ANTREC network* (a network developed at national level, having the county coordinating centre at Baia Mare) there are a few guesthouses in the settlements of Săpânța, Ocna Şugatag, Onceşti, Rozavlea, Şieu, Ieud, Botiza, Poienile Izei and Săcel. The *BED & BREAKFAST Network* groups a series of rural guesthouses from Săpânța, Vadu Izei and Ocna Şugatag.

From the point of view of tourism, the Romanian sector of Tisa ecological corridor may be divided into four distinctive areas:

- **Săpânța area** corresponds to the area dominated by Săpânța village, and it is favourable to *circuit tourism*, *rural tourism and mountain tourism*;
- **The area of Sighetu Marmației City** is characterized by complex types of tourism, due to the presence of the only urban centre in the analysed area;
- **Rona area** covers the part lying to the East of Sighetu Marmației, whose specificity comes from the national mixture of Romanians (Rona de Jos), Ukrainians (Rona de Sus, Lunca la Tisa), Hungarians (Coştiui) and mixed settlements with Romanians, Hungarians and Ukrainians (Tisa, Bocicoiu Mare). The existing attractive resources support *rural tourism* (14 rural tourism guesthouses, integrated to the functional tourism circuits) and *bathing tourism* (Coştiui and Crăciuneşti).
- **Pop Ivan mountain area**, within Maramureş Mountains, corresponds to the administrative area of Bistra commune, which has elements of tourist attractions specific for mountains, though a *low degree of tourism capitalization*.

Ukraine

Tourist infrastructure includes sanative and recreation establishments, tourist complexes, tourist bases, hotels and private farmsteads engaged in green tourism.

A number of tourism forms is being developed in Zakarpatska Oblast: health-related, recreational, cultural-cognitive (visiting historical and cultural places, archaeological heritage, memorials, familiarization with the life and activities of historical and cultural figures), qualified tourism (walking, cycling, water, rock climbing), eco-tourism (natural, learning and qualified in protected areas and reserves, ethnographic), conference tourism (fairs, exhibitions, academic conferences), rural tourism, religious tourism (visiting important religious objects).

Development of rural tourism is closely related to the development of Ukrainian rural areas, infrastructure, traditions, crafts revival, development of cultural and artistic traditions, makes it possible to improve the demographic situation and assists in solution of the employment problem. It is rural (green) tourism that could very quickly and with relatively small investments assist in solution of these problems. Innovative feature is that the funds for such small business are invested not in new plant construction or introduction of a completely new product, but in strengthening own farmstead of the rural population. The villages near rivers, lakes and mountains are the most popular among holiday makers. Picturesque spots of the region allow choosing the good holiday: fishing, picking mushrooms, raspberries, blackberries, blueberries, or herbs. Moreover, unique monuments of wooden architecture – ancient wooden churches, monuments of nature and history are available in many villages of the target area. In rural areas, there are many interesting excursion objects related to folk crafts – weaving, embroidery, pottery, basket weaving, woodcarving, etc., that reveal the origins and sources of folk culture.

In the future it will be necessary to meet the demand for ecotourism, which essence consists in preserving the original nature, the study of processes occurring in nature around a human being, protection of natural reserve fund in conjunction with pedestrian, equestrian, cycling and other forms of tourism, and raising eco-culture of tourists. The concept of ecotourism development in the region is based on familiarization of tourists with natural ecosystems, geological and geomorphological monuments. For this purpose, a network of routes for ecotourism closely related to green tourism (rural estates) has been plotted in the region. Carpathian Biosphere Reserve has a defining role in ecotourism development in the area.

Creation of tourist enterprises of various property patterns in Zakarpatska Oblast has gained considerable development. Such enterprises operate under licenses for organization of foreign and internal tourism, as well as for excursion activity. One more attractive aspect of the Oblast is a large number of cultural and mass events held for a full year.

There are 2 tourist information centres in the target area – in the cities of Berehovo and Rakhiv.

Objectives of the tourist information centres in Ukraine:

- promotion of tourism in Zakarpatska Oblast;
- provision of information to local and foreign tourists and tourist organizations;
- promoting cooperation among tourist organizations in Zakarpattia;
- holding trainings and seminars for professionals in the field of tourism;
- development of tourism opportunities in Zakarpattia.

Tourist Information Centres provide:

- information about the tourism potential of the Carpathian region;
- development of routes and organizing programs (medieval castles, thermal pools, walking tours, etc.);
- the organization of visits to wine cellars and tasting Transcarpathian wines;
- booking rooms for tourists;
- development and updating a tourist database of Zakarpattia and adjacent regions;
- access to the Internet, print of materials and photocopies;
- publication of information materials, guides, maps and distribution thereof;
- organizing training and educational tours.

Slovakia

There is only one accommodation facility for tourists in the target area: the hostel of the Municipal office in Veľké Trakany located in the building of a former customs warehouse in the centre of the village. The capacity of the accommodation facility is 27 beds in 3, 6 or 8-bed rooms. There is also one common kitchen, toilet and a shower at the end of the corridor.

There is also the Tisa Hunting Club in the village Veľké Trakany, which could possibly make some interesting offers for tourists.

Hungary

Chart 7. Accomodation beds in relation with spent guest nights in Hungarian PiP3 area

The total **commercial accommodation capacity** of the settlements along the River Tisa is in excess of 42000 beds. This represents 28% of the calculated commercial accommodation capacity of the Hungarian planning area within TICAD. This is a relatively favourable indicator considering that the settlements located along the River Tisa falling within the Hungarian planning area of TICAD only represent 13% of all the settlements. 4.5% of the total commercial accommodation capacity available in the country is found in this region.
However, accommodation capacity is not evenly distributed territorially. The Middle Tisa region has the most commercial accommodation capacity to offer with nearly 20000 beds. The Lower Tisa region takes second place with the Upper Tisa region lagging behind with just 8000 beds. Among other reasons, the higher accommodation capacity of the middle section is related to the outstanding attractiveness of the Lake Tisa and to the great development

potentials of the independent Lake Tisa Tourism Region created on the very basis of this attractiveness.

When reviewing accommodation capacity trends at the settlement level, the attractiveness of the traditional economic and touristic centres described before in this paper become truly obvious. For the most part, four types of settlements show outstanding results: multifunctional cities with a long history behind them (Szeged, Szolnok, Tokaj, Csongrád, Vásárosnamény, Szentes, and Hódmezővásárhely), more recently established cities that gradually become more and more attractive as tourist destinations (Abádszalók, Poroszló, Rakamaz, and Tiszacsege), a number of traditional centres of water sports tourism (Tiszabecs, Sarud) and a number of settlements that have recently built pensions, hotels, and camping sites (Tiszakécske and Cserkeszőlő). The two most outstanding cities in terms of accommodation capacity are Szeged (over 7000 beds) and Abádszalók (over 5000 beds). 66 settlements are without any accommodation for tourists; these are typically settlements under 2000 inhabitants mostly located in the north.

Territorial unit	Number of settlements (2009)	Population (2009)	Private accommodation, beds (2009)	Weekend house, beds (2009)	Commercial accommodation, beds (2009)	Total accommodation, beds (2009)
Upper Tisza	65	118725	1609	438	6000	8047
Middle Tisza	55	94421	6711	931	11847	19489
Lower Tisza	42	82368	2122	708	12336	15166
Total length	**162**	**295514**	**10442**	**2077**	**30183**	**42702**

Table 14. Accommodation capacity in settlements along the River Tisa in 2009 (beds)
Source: Eurostat

On the basis of the common European EUROSTAT database, the distribution of accommodation types in the settlements along the River Tisa shows the following picture: one fourth of the establishments are privately owned; over 70% are classified as commercial accommodation establishments. Weekend houses represent about 5%. According to the Hungarian TEIR data, which are more detailed than the EUROSTAT data, the majority of commercial accommodation establishments are camping sites and tourist houses. This shows a preference for water sports tourism, spa tourism, and other affordable modalities of tourism. The potential customers are families, groups of friends, and groups of students. When taken on their own, hotels represent 9% of the total. Within this sector, the number of health hotels is relatively low; these are only present in two settlements (Tiszaújváros and Szolnok). Additional health and wellness services must be offered in combination with high-standard accommodation. The opportunity for developing these is given as the ratio of settlements with access to local sources of thermal water is significantly higher than the national average, and Hungary's tourism strategy actually gives preference to developing health tourism. Total accommodation capacity within the River Tisza region has increased by 29% since 2001. This is a significant rate of increase if compared to the natural average (a dramatic decrease of 15%) or to the EU27 average (a slight increase of 1%).

Turnover

In addition to the supply side, the demand side – guest turnover in the region where a guest is a tourist who spends one night within the accommodation establishment – may also be examined by taking a look at the number and spatial distribution of guest nights spent and the changes in these data seen over time.

The statistical data only include tourists who use the services of accommodation establishments. Actual visitor rates may be estimated on the basis of other data (such as, e.g., the number of participants at certain events, etc.) and local surveys (such as, e.g., data relating to local residents, tourists on a day trip, and owners of weekend houses). The River Tisa is not a typical day trip destination for water sports tourism. Most trips to the river involve longer stays and what is called “passive rest”, which includes bathing and beach life during the summer. The main motivations for short trips are shopping, visiting friends and family, and participating in events.

The main indicator to measure demand for a given tourist destination is the number of guest nights spent. In 2009, the total number of guest nights spent was almost 1000000 in the region as indicated by the data found in the EUROSTAT database. This represents 4% of the total of Hungary within an area that represents 8% of the country. In proportion to population numbers, the total number of guest nights spent per 1000 locals is over 2300 in national average; the same indicator for the Hungarian planning area of TICAD is less than 1100, while the average of the settlements along the River Tisza is over 3000. This means that, especially during the summer high season, certain popular holiday destinations located along the River Tisza cater for several times more tourists than the number of local residents.

Territorial unit	Number of settlements (2009)	Population (2009)	Private accommodation, guest nights (2009)	Weekend house, guest nights (2009)	Commercial accommodation, guest nights (2009)	Total, guest nights (2009)
Upper Tisa	65	118725	18503	7722	74299	100524
Middle Tisa	55	94421	80857	39771	252898	373526
Lower Tisa	42	82368	71969	39631	393385	504985
Total length	162	295514	171329	87124	720582	979035

Table 15. Guest nights spent in settlements along the River Tisa in 2009
Source: Eurostat

Guest nights are not distributed evenly. The number of nights spent is the highest in the settlements of the Lower Tisza region; in fact, it is five times as high the average of the Upper Tisza region and well above the average of the Middle Tisza region. Over the course of the year, the cities in the south have more permanent and seasonal attractions to offer to tourists. As the above analysis indicates, the total accommodation capacity of the Lower Tisza region is lower, but the occupancy rates are higher. In comparison of the individual settlements, Szeged and Cserkeszőlő see the highest turnover of guests with over 100,000 guest nights each, the former as a traditional centre of tourism, and the latter as a settlement active in thermal tourism. Another 16 settlements (Tiszafüred, Szolnok, Tiszaújváros, Hódmezővásárhely, Abádszalók, Vásárosnamény, Poroszló, Szentes, Sarud, Tokaj, Tarcal, Rakamaz, Tiszakécske, Csongrád, Martfű and Szajol) report over 10000 guest nights annually. Out of the 162 settlements within the River Tisa, 70 see no tourism as far as guest nights are concerned. This is a very high proportion (43%).

Taking a look at the distribution of guest nights by type of accommodation–once again, we draw on the data of the common European EUROSTAT database–over 70% of the guests visiting the River Tisza region choose to stay in commercial accommodation establishments. The TEIR database shows that within the commercial establishments visited, the accommodation types most frequently used are hotels, camping sites, and pensions. Private accommodation is also highly popular both in cities and in villages.

Reviewing the trends of the period between 2001 and 2009, a fluctuation in the number of guest nights spent in the region can be noticed, with an increasing trend at the beginning of the decade later followed by a decline. The overall increase was 8%. This is the same as the national average; however, it is less favourable than the average of the Hungarian planning area of TICAD (a growth of 13% in demand during the same period).

When calculating the expected return on, and the efficiency of any tourism related investment, a key aspect is the analysis of occupancy rates as indicated by the number of guest nights per bed within a given year. The occupancy rate of accommodation establishments in settlements along the River Tisa is 6%, while the typical average occupancy rate in respect of the Hungarian area within TICAD is 10%, a rate is closer to the national average (12%).

Serbia

Destination Management – the key for tourism development

The holders of destination management in the Serbian Tisa Catchment Area are tourist organization of municipalities (Kanjiža, Bečej, Zrenjanin, Senta, Ada, Kikinda, Žabalj, Titel) and The Tourist Organization of Vojvodina. The main weakness in their work is recognized in inadequate professionals capacity, lack of good programs for the evaluation of tourist resources, and insufficient information of population and potential providers of tourism services.

Accomodation facilities

Throughout the region of the Tisa River, registered accommodation facilities are in the function of tourism supply. It is observed that some municipalities (Kanjiza, Zrenjanin,) have varied and numerous accommodation facilities, while most of them have less diverse gastronomic offer and / or facilities with a lower category is particularly evident with Coka, N. Knezevac, Žabalj. In some municipalities there is no hotel accommodation at all, while in others there is insufficient accommodation capacity in private households. For some objects information about the type, capacity and category are unclear, and traffic data are missing completely.

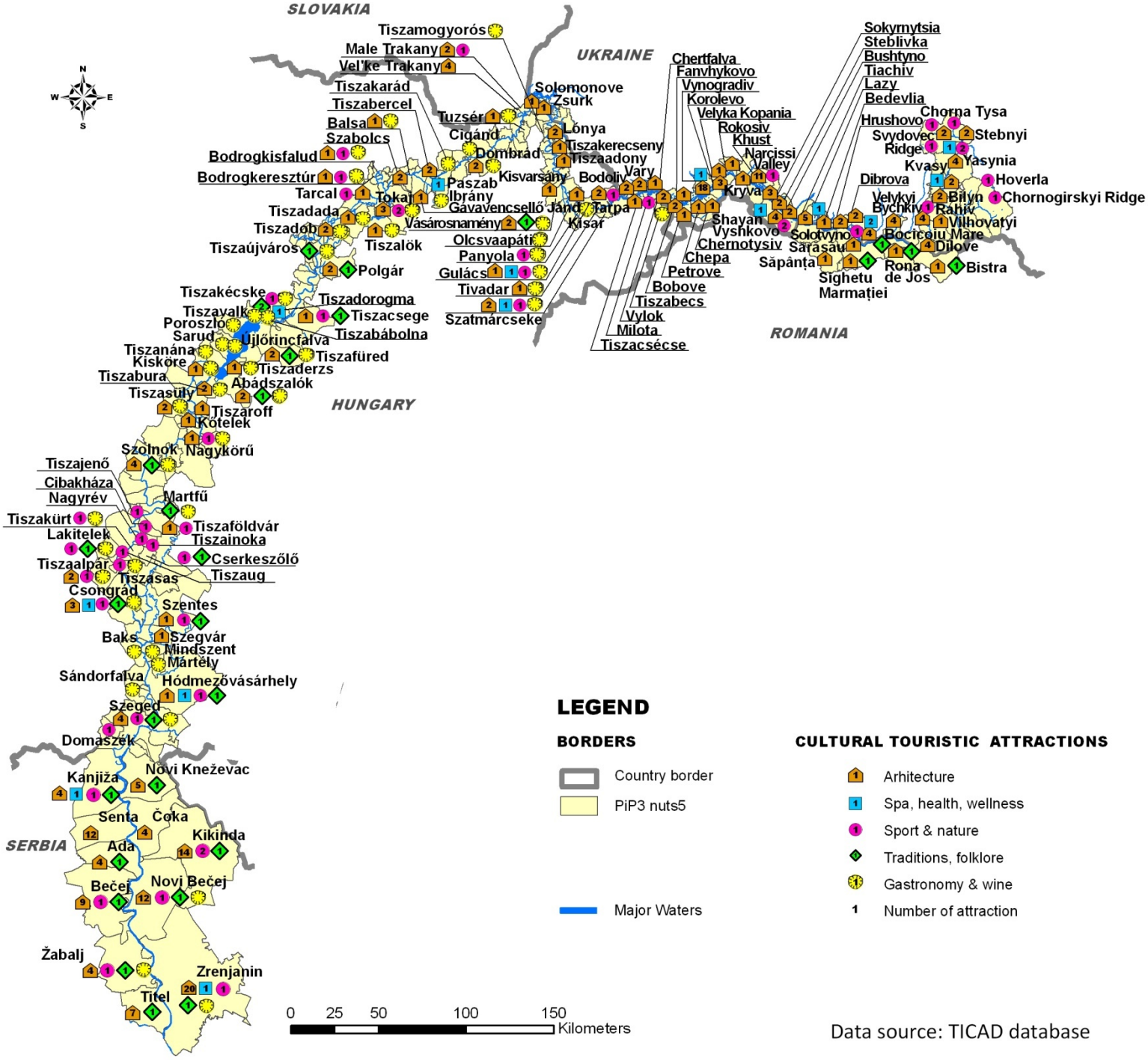


Figure 11. Cultural touristic attractions in PiP3 area

	Strenghts	Weaknesses	Opportunities	Threats
Romania	- High share of touristic facilities; - Complex touristic potential, both natural and antropic; - Existence, in Sighetu Marmației, of a higher education institution where specialists in tourism can be formed; - Low degree of pollution.	- Diminishing number of rural touristical facilities; - Uneven distribution of touristical resources, from the point of view of structure, volume and possibilities of valorification; - Low accessibility of certain settlements with valuable monuments; - Valuable areas not enough equipped for tourism; - Undiversified accommodation facilities.	- Near-border location; - Growing interest for national or European funding programs; - Launching on national and European scale original touristic products; - Launching ecological reconstruction programs.	- Economic crisis; - Weak promotion of touristical resources and of touristical facilities; - Reorientation towards foreign touristical destinations; - Lack of integrated vision on natural resources (both in terms of protection and tourism); - Transit tourism prevails; - Low offer on training programs in tourism; - Doubtful tastes (proliferation of kitsch); - Climate change.
Ukraine	- The harmony of nature, mild climate, dense river network, sink mountain lakes, caves, the existence of curative mineral springs, deposits of ozokerite, mud treatments, interesting history of the region with its unique relics of the past are exclusive conditions for the formation of popular recreational and tourist centres in the region; - Passing through the target area of transit roads and railways also contribute to tourism development in the region.	- Insufficient development of tourist and attendant infrastructure reduce current tourist potential of the region.	- Near-border location furthers attractiveness for tourists from other countries.	- Natural hazards such as floods, landslides and avalanches, but it seems the influence can't be determinative.
Slovakia	- Suitable conditions for ecotourism and agrotourim; - Potential for the development of tourism due to several unique natural, cultural or historical preconditions.	- Insufficient usage of tourism potential; - Low competitiveness of facilities and very limited or not existing tourism services with required standard; - Insufficient usage of the cross-border cooperation for tourism development.	- The target area is part of the Medzibodrožie Region which creates opportunities for development of tourism.	- Distant position from rich markets and relevant difficulty to attract rich customers; - Higher costs to promote tourist attractions and products; - Loosing the competitiveness due to insufficient infrastructure.

Hungary	- The Tisza and its water network serve as a unique ecotouristic value; - The Tisza-tó area is a major resort area (Independent Touristic Region); - The region is rich in medicinal and thermal waters and spas; - The natural environment, the cultural traditions and heritage sites, the culinary diversity, area specific products provide a background for regular programmes, attracting an increasing number of visitors.	- Strong seasonality in tourist traffic and hence in the utilisation of tourist infrastructure; - The service infrastructure and the accommodation services present major shortcomings; - High environmental load coming from the touris resort areas built in the flood prone area.	- Growing demand for eco tourism, rural tourism and active tourism; - Better European Union support opportunities for the eco friendly developments.	- Deterioration / destruction of architectural heritage; - Investments compromising the natural and cultural environment; - Vanishing of traditional flood plain landscapes and landscape management practices.
Serbia	- The most important natural resource with rich rivers Tisa and channel DTD- significant amounts of water; - Very beautiful panoramic views, places of rich cultural and historical heritage and gastronomy, which represent good potential for development of river tourism; - Multiculturalism in districts: in Vojvodina there is significant potential for development of additional tourist attractions.	- Insufficient development of existing infrastructure and superstructure for the development of nautical tourism; - Lack of accommodation and catering facilities with adequate level of servicing; - Unused tourism potentials.	- Attracting foreign investment in infrastructure and tourism; - Simplification of procedures for obtaining permits for the construction of marinas; - The development of economic sectors directly linked to the development of different forms of tourism (wine and grape processing, food industry, handicrafts, commerce, etc.).	- Slow economic development, unstable political situation and poverty that domestic demand is too long kept at a low level affects tourism; - Lack of motivation of local authorities to use the resources available for development of tourism sector.

Table 16. SWOT analysis on Tourism in PiP3 area

SUMMARY

The green corridor along Tisa River is a diverse territory from many points of view; it's diversity generates complex relations on various levels; still, due to certain similar conditions, two main sectors can be identified:

- **North-Eastern part of the corridor (Romania and most of Ukraine)**
- the place where Tisa begins (confluence of White and Black Tisa Rivers, in Ukraine);
- mountainous area, with rapid water flows, therefore not suitable for navigation;
- dealing with fragmentation of forests, thing that favours floods and landslides;
- the sector with the highest shares of natural uses of lands;
- transportation routes along Tisa (main roads and railway);
- various forms of tourism and cultural heritage, with specific values (climate, mineral waters, therapeutical resources, wooden architecture, traditional rural culture and civilisation);

It is the longest sector where Tisa is a border between countries. This situation can be favourable from the point of view of the ecological corridor, as human activities with polluting potential are less developed around border. But a border between countries is also a limit between different policies on the same issues; this can lead to situations when some animals are protected in one country and not protected in the other (for example some species of fish are protected in one of the countries and not in the other one and this makes possible throwing the rods from it's banks and still catch the protected fish). Also, a river as a boundary implies having the same procedures to follow in case of flood preventing, in order to have efficient measures along the river as a whole[9].

The main opinions of the stakeholders:

- interest in the possibilities offered by TICAD project to support the **improvement of the Romanian–Ukrainian collaboration for a common management of the Tisa River**[10].

- **necessity to create integrated observing and warning systems**, requiring a better monitoring of weather and hydrological parameters and sending real-time warnings to the neighbouring countries by using electronic systems[11].

- **necessity of cross-border water supply and sewage systems and their integrated management** in order to support the development of a uniform cross-border infrastructure[12].

- necessity of supporting the creation of **cross-border cooperation projects for promoting the preservation of biodiversity and the development of niche tourism** with positive impact upon the population in the area, in the context of

[9] Information extracted from the meeting with the Romanian stakeholders, held in Baia Mare on 13th of July 2011.
[10] National Administration "Romanian Waters" – Someş-Tisa Water Branch, Maramureş Water Management System, RO.
[11] Maramureş Inspectorate for Emergency Situations, RO.
[12] Maramureş Intercommunity Development Association, RO.

different rules and legislation adopted and implemented by the neighbouring countries at the moment[13].

The north-eastern part of Tisa corridor is the place to explore what Tisa generated, more than exploring Tisa itself: landforms, people and the traces they left, in time, on the territory.

- **South-Western part of the corridor (mainly Hungary and Serbia, but also Slovakia and a part of Ukraine).**

- the place where Tisa ends, flowing into the Danube in the northern part of Serbia;
- lower lands, slower water flows, a lot of oxbow lakes;
- suitable for navigation (freight and tourism);
- mainly agricultural, affected by floods and excess water;
- the sector with the most complex interventions in order to control the force of waters (Vásárhelyi plan in Hungary, Danube-Tisa-Danube canal system in Serbia);
- the sector with the highest shares of human intervention in the landscape (arable lands, but also urban fabric);
- various forms of tourism and cultural heritage, with specific values (spa, traditional wine areas, archaeological sites);

This sector is longer than the other one. The river mainly crosses the countries (mostly Hungary), but it also has small sections where it is border (HU – UA, HU – SK, HU – SR). This allows more independence at national/local level when deciding the measures to be taken in the territory (but with more attention for the border area). Due to more intensive use of land, this area is vulnerable to pollution, while due to the geographical features, it is vulnerable to aspects related to flooding.

The main opinions of the stakeholders:

- **low quality of water** is the obstacle for the efforts to develop tourism on local scale[14].

- interest in the possibilities offered by TICAD project to support the **improvement of the environmental conditions** in the area;

- suggestion to create an **active database, which would identify main polluters** in the area by better monitoring of weather parameters[15].

- **slow reforestation trend** in the area as serious ecological and environmental problem that should be urgently tackled[16].

- demands for common, **comprehensive spatial change database that would be open** for all the stakeholders[17].

The south-western part of Tisa corridor is the place to explore (even through navigating on Tisa) how the main tributary of the Danube is present in the territory, how it generated ways of living, ways of using the land.

[13] EcoLogic Association, RO.
[14] Ada Municipality, SR
[15] USPV, SR
[16] Faculty of agriculture, SR
[17] Environmental NGO, SR

SWOT

Tisa corridor, as an ecological network, was analysed by studying the main factors that determined the actual state and that have an influence on the future sustainable development of the target area: transportation, nature and environment risks, landuse and protected areas, touristic resources. These elements are basic units that can be found/combined in one or several more complex intervention domains like:

- water management and flood control
- preservation and development of the biodiversity
- development of potentials of the ecotourism and eco friendly recreation
- development of sustainable land use in the flood area.

Considering these themes as the main strategic directions of action in Tisa ecological corridor, they were also used for to synthesize the current state of the target area by positive and less positive aspects.

- **Water management and flood control**

Strengths

Among the *Spatial and environmental elements* there is **a general non industrial character of the economy in the target area,** except the Hungarian and Serbian river sectors, there is a low industrial activity in Tisa corridor, generally there are no large industrial sites (SEVESO) and in Hungary the Industrial pollutants show a slowly declining trend; **low number of water pollution emissaries in this area** that permit a large number of water bodies to reach a good environmental status, in the Romanian sector of Tisa river, because of its high flow and restructuring of industrial-mining activities, it was able to exceed the "critical state" induced as a result of accidental pollution on its tributary, the River Vişeu. The **existing flood protection system (protection lines, reservoirs)**, the embankments, the flood reduction reservoirs and the lines of defense ensure partial protection against floods along the rivers. Participation of the stakeholders to **the implementation of several water management projects** emphasizes the importance of Tisza ecological corridor to the welfare of local communities and investors.

Weaknesses

The *spatial/ environment elements* are related to the state of the general infrastructure that generates a considerable impact on the environment, the **insufficient connection to the sewage network**, the **port infrastructure** which acts as a **local emissaries causing water pollution**, which is complemented with the exploitation and processing practices like the **presences of several industrial waste dump sites**, **waste disposal along riverbanks and flood prone areas**. The local pressure deriving from land use change and urbanization contribute to the **presence of buildings within the floodplain**, the **narrowing of the flood prone area**.

Since the river floodplains present attractive resources there are several *economic and social elements* manifested as weaknesses for the ecological corridor, marked by the **exploitation of construction materials along the riverbanks without proper impact evaluation**, **the**

residential and tourism structures generate an important environmental load which is amplified by the **inconsistent cooperation between water agencies**.

Opportunities

Spatial/ environment elements:

Rehabilitation of wild junkyards and remediation of contaminated soil. EU policies increasingly emphasise waste management importance, according to the Sustainable Development Strategy 2006, which aims at reducing the overall use of non-renewable natural resources. The more recent EU legal instruments and strategies, such as the revised Waste Framework Directive (2008/98/EC), the Thematic Strategy on the prevention and recycling of waste and the 6th Environmental Action Programme (EAP) prioritise waste prevention. The Waste Framework Directive (WFD) introduces and defines basic concepts and lays down waste management principles such as the waste hierarchy (disposal/ other recovery/ recycling/ preparing for re-use/ waste prevention). Waste prevention is the most favourable option in the waste hierarchy. The main waste treatment activities are regulated by the Landfill Directive, the Waste Incineration Directive and the IPPC Directive. For some special waste streams such as packaging waste, end-of-life vehicles and waste electrical and electronic equipment, the principle of the waste hierarchy has been transformed into concrete targets for recycling.

Possibility to flood the low meadows along the river. Measures that are likely to be more cost-effective than traditional grey infrastructure such as dams and dikes include the preservation and restoration of floodplains, including reverting arable land into flood meadows, fostering biodiversity. EU attention is drawn towards decisions on land use management, such as in floodplain areas which play an important role in helping to alleviate floods by storing water and releasing it back slowly into streams and rivers.

Economic/ social elements:

DIRECTIVE 2007/60/EC on the assessment and management of flood risks (space for the river). Flood risk management plans should focus on prevention, protection and preparedness. With a view to giving rivers more space, they consider, where possible, the maintenance and restoration of floodplains, as well as measures to prevent and reduce damage to human health, the environment, cultural heritage and economic activity.

Possibility of accessing EU funding programs and also national programs. The General Directorate for the Environment makes funding available through two different programmes, the LIFE fund and the Eco-Innovation and Competitiveness and Innovation Framework Programme, and operating grants to environmental non-governmental organisations (NGOs). *LIFE* is the European Union's financial instrument supporting environmental and nature conservation projects throughout the Union and in some candidate and neighbouring countries. Another instrument for funding interventions for environmental purpouses is the *European Regional Development Fund (ERDF)* which is designed to reduce economic, environmental and social problems in towns. Naturally disadvantaged areas geographically speaking (remote, mountainous or sparsely populated areas) benefit from special treatment.

The development of environmentally friendly production technologies. Is part of the EU`s sustainable development vision. Environmental technologies are a central element of the European Union's approach to major environmental challenges such as climate change,

natural resource scarcity and biodiversity loss. Eco-innovation is any innovation that can contribute to environmental protection or a more efficient use of resources. The European Commission set up the Environmental Technologies Action Plan in 2004, to speed up the removal of financial, economic and institutional barriers to the development of environmentally friendly technologies.

The existence of legislation in conformity with the EU legislation. The member states must conform to the EU`s vision and instruments of application meant to integrate environmental sustainability with economic growth and welfare by decoupling environmental degradation from economic growth and doing more with less.

International cooperation through the integration process. It is achievable through the *Cohesion Fund* which aims at strengthening the economic and social cohesion with a view to promoting sustainable development. The Cohesion Fund finances actions on the environment, the trans-European transport networks.

Possibility to develop cross-border waste-treatment system

Threats

Spatial/ environment elements:

Increasing impacts of climate change, growing frequency of extremities. The impacts of climate change are already being observed and are projected to become more pronounced. Climate change is one of the greatest environmental, social and economic threats.

Increasing natural hazard such as floods, landslides and avalanches. Extreme weather events, including heat waves, droughts and floods, are expected to become more frequent and intense. Disparities in the access to clean air, water and soil do not only appear between countries and regions but also between urban and rural areas as well as inside cities.

Economic/ social elements:

The amplification of deforestation. Illegal logging is probably one of the most destructive activities contributing to deforestation. It has damaging consequences on biodiversity and on climate change. Deforestation also drives climate change. Forest soils are moist, but without protection from sun-blocking tree cover they quickly dry out. Trees also help perpetuate the water cycle by returning water vapor back into the atmosphere. Without trees to fill these roles, many former forest lands can quickly become barren deserts.

➢ **INTERNAL FRAMEWORK**

Strengths		*Weaknesses*	
spatial / environment	a general non industrial character of the economy in the target area	**spatial / environment**	the presences of several industrial waste dump sites
	low number of water pollution emissaries in this area		waste disposal along riverbanks and flood prone areas
	existing flood protection system (protection lines, reservoirs)		insufficient connection to the sewage network
			port infrastructure generates local emissaries causing water pollution
			presence of buildings within the floodplain
			narrow flood prone area
			the existence of areas vulnerable to nitrate pollution
economic / social	the implementation of several water management projects	**economic /social**	exploitation of construction materials along the riverbanks without proper impact evaluation
			the residential and tourism structures generate an important environmental load
			inconsistent cooperation between water agencies

Table 17. SWOT analysis on Water Management and Flood Control in PiP3 area/Internal Framework

➢ **EXTERNAL FRAMEWORK**

Opportunities		*Threats*	
spatial/ environment	rehabilitation of wild junkyards and remediation of contaminated soil	**spatial/ environment**	increasing impacts of climate change, growing frequency of extremities
	possibility to flood the low meadows along the river		increasing natural hazard such as floods, landslides and avalanches
economic/ social	DIRECTIVE 2007/60/EC on the assessment and management of flood risks (space for the river)	**economic/ social**	the amplification of deforestation
	possibility of accessing EU funding programs and also national programs		
	the development of environmentally friendly production technologies		
	the existence of legislation in conformity with the EU legislation		
	international cooperation through the integration process		
	possibility to develop cross-border waste-treatment system		

Table 18. SWOT analysis on Water Management and Flood Control in PiP3 area/External Framework

- **Preservation and development of the biodiversity**

Strengths

As previously shown, in the case of the water management, an important strength element of a *spatial and environmental* nature is the **general non industrial character of the economy in the target area** that supports the creation of a viable ecological corridor on Tisa River. The ecological corridor would include natural and semi-natural areas of national and regional importance due to **the unregulated character of River Tisa, resulting in a unique natural state in the European river system**, as well as the biological interrelations maintained between them. The adequate biological diversity is also supported by the **high share of forests in the upper sites and in the flood prone areas.** The forest and semi natural land use of Tisa River corridor portrays a large share of this category in *Romania*, where forests cover 61.47% of the considered territory. Moreover, another strenght is represented by the **existence of natural and semi-natural habitats within the embankments.** It benefits of a **good ecological quality within the protected areas and the river tributaries**, in the context of industrial restructuring and the **implementation of several water management projects** in this target area. In most cases, the elements of the ecological network also include those specific areas located within the wider area of the ecological network that enjoy national or international protection within the **high variety of natural protected areas, including UNESCO and RAMSAR sites**. From a social and economic perspective, the most important strength is the **integration of the natural protected areas in ecotourism** which is a small scale alternative to the standard commercial tourism, based on personal growth and environmental responsibility, offering tourists insight into the impact of human beings on the environment, and generates a greater appreciation of the natural habitats.

Weaknesses

The term that defines the elements of *spatial and environment* weakness is pollution. It is produced through **the presences of several industrial waste dump sites**. There are also several Seveso plants within the area under study. Ten of these are hazardous plants with a lower limit value, while 13 are hazardous plants with a higher limit value. The **traffic running parallel with the river causes air and noise pollution,** which especially affects the birds during the nesting periods. The sounds are becoming so ubiquitous that they may threaten biodiversity. On the other hand a weakness is the **existence of areas vulnerable to nitrate pollution** and the **pollution of the river ecosystem, due to a poor connection of the households to the sewerage network**, the domestic waste waters are either stored in cesspits or drained freely into the environment. Moreover, in the target area, the **traffic crossing the river disrupts not only the ecological corridor but also the landscape, disturbing the natural environment,** putting an additional pressure upon the biodiversity, being linked to the **fragmentation of the ecological network, in terms of land use and legal status** is a current threat. Habitat fragmentation as a result of the construction and use of infrastructure is a major cause of worsening the quality of the natural environment. Fragmentation is dangerous due to splitting the natural ecosystems into smaller and more isolated patches. The *social and economic* elements acting upon biodiversity is **the exploitation of construction materials along the riverbanks without proper impact evaluation**.

Opportunities

The importance of preserving the natural heritage is acknowledged through the *economic and social elements:*

Possibility of accessing EU funding programs and also national programs and **international cooperation through the integration process.** Two new tools for combating biodiversity loss have been developed by the European Commission and EEA: the BISE and the 'biodiversity baseline'. BISE, the Biodiversity Information System for Europe, is a web portal centralising information about European biodiversity in a single location. The 'biodiversity baseline' is developed as a snapshot of the current state of biodiversity to establish the evidence base necessary for stepping up the EU action to address the European and global biodiversity crisis now. EU nature conservation policy is based on two main pieces of legislation: the Birds Directive and the Habitats Directive**.** Both directives provide the basis for the Natura 2000 network, a network of nature reserves which extends across the Union to safeguard species and habitats of special European interest. EU nature conservation policy benefits from a specific financial instrument, the LIFE-Nature fund.

The existence of a legal framework for the protection of natural areas, in conformity with the EU legislation. Each country in Tisa ecological corridor adopted the EU legislation regarding the classification and the management practices of protected areas. In Romania, the setting up of Government Decree no. 57/2007 had the role of harmonizing the national legislation with that of the European Union in the field of nature protection. It created the institutional framework for the application of the stipulations contained in the 79/409 CEE Directive regarding the conservation of wild birds and the 92/43/CEE Directive concerning the conservation of natural habitats and of wild flora and fauna species and established the sanctions for the infringement of these provisions.

Threats

Spatial/ environment elements:

Increasing impacts of climate change, frequent flooding of ecosystems in the low riverside floodplains leads to the temporary disturbance of existing habitats. The link between climate change and biodiversity has long been established. Although throughout Earth's history the climate has always changed with ecosystems and species coming and going, *rapid* climate change affects ecosystems and species ability to adapt and so biodiversity loss increases. Climate change is already having an impact on biodiversity, and is projected to become a progressively more significant threat in the coming decades. In addition to warming temperatures, more frequent extreme weather events and changing patterns of rainfall and drought can be expected to have significant influences on biodiversity.

Economic/ social elements:

The most common threats upon biodiversity comes from mentalities and behaviors, **illegal hunting and fishing inside protected areas,** the **amplification of deforestation** bring constant losses to the natural heritage, by fragmenting the habitats and affecting the ecosystem cohesion.

On the other hand, indirect human interventions, like **the execution of river bed arrangement/ regulating works, not in line with the demands concerning the protection and conservation of biodiversity,** and the insertion of **new infrastructure elements that determine ecological barriers** are elements that increase the degradation of the biodiversity reserves.

Expansion of tourism activities, in an uncontrolled manner acts as an added pressure upon the natural heritage, as people tend to benefit from a larger mobility regarding the possibility to practice tourism.

➢ **INTERNAL FRAMEWORK**

Strengths		***Weaknesses***	
spatial / environment	a general non industrial character of the economy in the target area	**spatial / environment**	the presences of several industrial waste dump sites
	unregulated character of River Tisa, resulting an unique natural state in the European river system		traffic crossing the river disrupts not only the ecological corridor but also the landscape
	good ecological quality within the protected areas and the river tributaries		traffic running parallel with the river causes air and noise pollution, disturbing the natural environment
	high variety of natural protected areas, including UNESCO and RAMSAR sites high share of forests in the upper sites and in the flood prone areas existence of natural and semi-natural habitats within the embankments		existence of areas vulnerable to nitrate pollution
			pollution of the river ecosystem, due to a poor connection of the households to the sewerage network
	the implementation of several water management projects		fragmentation of the ecological network, in terms of land use and legal status
economic / social	integration of the natural protected areas in ecotourism	**economic /social**	exploitation of construction materials along the riverbanks without proper impact evaluation

Table 19. SWOT analysis on Preservation and Development of Biodiversity in PiP3 area/Internal Framework

➢ **EXTERNAL FRAMEWORK**

Opportunities		***Threats***	
spatial/ environment		**spatial/ environment**	increasing impacts of climate change, frequent flooding of ecosystems in the low riverside floodplains leads to the temporary disturbance of existing habitats
economic/ social	possibility of accessing EU funding programs and also national programs	**economic/ social**	illegal hunting and fishing inside protected areas
	international cooperation through the integration process		amplification of deforestation
	the existence of a legal framework for the protection of natural areas, in conformity with the EU legislation		the execution of river bed arrangement/ regulating works, not in line with the demands concerning the protection and conservation of biodiversity
			new infrastructure elements determine ecological barriers
			expansion of tourism activities, in an uncontrolled manner

Table 20. SWOT analysis on Preservation and Development of Biodiversity in PiP3 area/External Framework

- **Development of potentials of the ecotourism and eco friendly recreation**

Strengths

Spatial/ environment elements:

From the touristical point of view, the PiP3 territory is very special inside the TICAD area, being characterized by **high variety and value of the natural and anthropic sites that Tisa crosses**:

- The north-eastern part of the target area is mountainous, with rapid water flows and waterfalls (in Romania – Şipote, Mireş, Covătari and Izvoru Runcului, also in Ukraine – Khust, Yasynia), while the south-western part has lower lands, slower water flows, a lot of oxbow lakes.
- **High variety of natural protected areas**: national protected areas, Biosphere Reserve (Ukraine, Hungary), Ramsar sites (Slovakia, Hungary), Natura 2000 sites (Romania, Hungary)
- **High share of forest lands in the total area of the region**
- Spa facilities are a constant feature along the corridor: mineral waters, therapeutic muds and brine of lakes in Ukraine, health and thermal spas in the Upper Tisa Region in Hungary, also in Serbia (the most distinctive being in banja Kanjiža and Bečejska banja) where there are also several mineral water sources that have not yet been tapped (in the municipalities of Senta, Coka and Ada).
- Castles (mostly in Hungary, but also in Ukriane – Vyshkovo, Vynohradiv, Khust)
- Wood architecture (especially in Romania and Ukraine, the most representative examples reffering to churches)
- Archaeological traces (in Romania – Sighetu Marmației, Sarasău, Crăciuneşti; in Serbia – Titel, Novi Bečej, Bečej, Žabalj, Kikinda, Čoka, Senta)

The special character of the natural and antropic attractions is supported by a **non industrial character of the economy** in the target area; this determined a lower pollution rate, allowing to keep a **good ecological quality of protected areas and even of the Tisa's tributaries** (especially in the upper part of Tisa).

The possibility of alternative ways to discover the attractions in the target area can have a major contribution to the ecological character of the corridor; in this regard, the **presence of bicycle routes** in some sectors (especially Slovakia and Hungary) is a very good strating point for a transnational bicycle route network.

As the target area runs along a major river, this can be a sensitive aspect in tourism activities from the safety point of view, but there is already an **existing network of dikes for flood control**, in every country that Tisa crosses.

Even if the special rules related to border areas can be considered as barriers in the free and smooth discovery of the territory, taking into account the the contemporary political context, this kind of limits in the territory cannot be avoided. From this point of view, the **presence of cross border points** is a positive aspect, as they allow connections. The simplest situation is in the case of the border between Hungary and Slovakia, as these two countries are part of the Schengen area and no border control is needed; at the opposite are the borders with non EU countries (Serbia and Ukraine).

Related to *economic and social elements*, a **diverse ethnic structure that can be found in the northern part of the territory** can be considered as an advantage in touristic activities, as it can provide, on a small scale territory, a large range of attractions related to traditions.

Weaknesses

Spatial/ environment elements:

Transportation is a key element when talking about discovering a large and diverse territory as the one that PiP3 refers to; even if **the connectivity between settlements in the target area is considered low**, still, from an eco-tourism point of view, **the transportation network is dense and sustains pollution**; this is enforced by the **degraded railway network** which could be an alternative for good connections.

Poor connection of the households to the sewerage system is a general problem in PiP3 area; more than 50% of the dwellings lack this service even if they are connected to water supply systems. **Waste disposal along riverbanks and flood prone area** is another source of pollution and even unsafety, also the **exploitation of construction materials along the riverbanks without proper impact evaluation**.

Facing this kind of situations with low connectivity to basic services, **lack of care on the landscape** in the settlements is no wonder; there are settlements which benefit of natural or antropic attractions but these ones stand alone, without being integrated in a coherent image on the settlement scale. This is also reflected by *economic and social elements* like **low quality of tourism services and infrastructure, low quality of public & private spaces, low language and hospitality skills.**

A **bad public transportation offer** generates addiction to the use of personal cars, thefore a low mobility between settlements, between touristic attractions. It shouls be also mentioned the **lack of possibility to have a water circuit on the whole length of Tisa, due to the fact that the river is not navigable in the northern part**.

Opportunities

In a general context of **a growing international interest for ecological tourism**, the plans to improve the *water management and flood control* and also the *preservation and development of the biodiversity* will also have a positive influence on the touristical potential (both related to the *spatial/environment elements* and to the e*conomic and social elements)*: **rehabilitation of wild junkyards and remediation of contaminated soil, flooding of low meadows along the river, waste management national strategy, possibility of accesing European funding programs and also national programs, Crossborder Cooperation**.

Most of the settlements along the corridor are rural areas where traditions are well preserved, offering the background for an integrated circuit of **traditional craftsmanship**. The idea of circuits is sustained by the increased awareness of mobility which can be seen in the **measures** already taken **on local, regional and national scale for the modernization of road infrastructure**.

Threats

Taking into account that the aim is to develop the potential of ecotourism and recreation, the threats reffering to s*patial/ environment elements* are closely related to those for *water management and flood control* and also available for the *preservation and development of the biodiversity*: **intensive and non-sustainable development, absence of accident situation protocols, lack of regulation regarding Natura 2000 sites, illegal hunting and fishing inside**

the protected areas, environmental hazards such as floods, landslides and avalanches, climate change. It is important to urnderstand that resources, problems and solutions that may seem to belong to different domains, are actually linked; one problem cand find solutions from more sides, and one solution can bring advantages to more domains.
Related to *economic and social elements*, **weak promotion of tourism** can be mentioned as a major threat; people do not have the know-how, while local authorities concentrate on other priorities.

- **INTERNAL FRAMEWORK**

Strengths		***Weaknesses***	
spatial / environment	Existing network of dikes for flood control	**spatial / environment**	Dense transportation network that sustains pollution
	High value of natural and cultural resources		Low connectivity between settlements in the target area
	Presence of cross border points		Degraded railway network
	The high variety of natural protected areas located in the target area		Poor connection of the households to the sewerage system
	Bicycle routes available in some sectors		Exploitation of construction materials along the riverbanks without proper impact evaluation
	High variety of natural and anthropic sites that Tisa crosses		Landscape is not cared for
	In upper part of Tisa, the tributaries are of good ecological quality		
	Good ecological quality of protected areas		Waste disposal along riverbanks and flood prone area
	High share of forest lands in the total area of the region		
	Non industrial character of the economy of the target area determine lower pollution rate		
economic / social	Diverse ethnic structure in the northern part of the territory	**economic /social**	Low quality of tourism services and infrastructure
			Low quality of public & private spaces
			Bad public transportation offer
			No possibility to have a water circuit on the whole length of Tisa, due to the fact that the river is not navigable in the northern part
			Language skills are low
			Hospitality skills are low

Table 21. SWOT analysis on Development of potentials of the ecotourism and eco friendly recreation in PiP3 area/Internal Framework

➢ **EXTERNAL FRAMEWORK**

Opportunities		*Threats*	
spatial/ environment	Measures on local, regional and national scale for the modernization of road infrastructure	**spatial/ environment**	Intensive and non-sustainable development
	Rehabilitation of wild junkyards and remediation of contaminated soil The presence of the waste management national strategy		Absence of accident situation protocols
	Flooding of low meadows along the river		The lack of regulation regarding Natura 2000 sites
			Illegal hunting and fishing inside the protected areas
			Environmental hazards such as floods, landslides and avalanches
			Climate change
economic/ social	Possibility of accesing European funding programs and also national programs	**economic/ social**	Weak promotion of tourism
	Crossborder Cooperation		
	Growing international interest for ecological tourism		
	Traditional craftsmanship		

Table 22. SWOT analysis on Development of potentials of the ecotourism and eco friendly recreation in PiP3 area/External Framework

- **<u>Development of sustainable land use in the flood area</u>**

Strengths

Out of the spatial and environmental elements, the most relevant for the Tisa river ecological corridor, there are the **existence of a network of dikes for flood control**, many embankments and dams are in place and several projects are being developed, among which "Veľké Trakany – Tisa Dam Reconstruction" Project and the Improved Vásárhelyi Plan. There is also a **high value of natural and cultural resources**, due to the fact that Tisa River contains rare examples of a natural and near-natural wetland type found within the Pannonian biogeographic region. **The high variety of natural protected areas located in the target area**, considering that the site supports vulnerable, endangered and critically endangered species including some endemics, as well as threatened ecological communities, included on the IUCN red-list. **In upper part of Tisa, the tributaries are of good ecological quality**, since there is no significant industrial activity that would evacuate polluting substances into the environment. In 1999-2000, international negotiations took place to protect the area and to prevent further ecological disasters. **Good ecological quality of protected areas** is also reflected in High share of forest lands in the total area of the region, Non industrial character of the economy of the target area which determines lower pollution rate.

Weaknesses

The main weakness are of spatial and environmental nature, summarized in **low connectivity across Tisa**, the transportation network is considered to be insufficiently developed in order to assure good territorial connections inside the corridor and with the other territories inside TICAD. According to the proposed transportation infrastructure, it can be noticed that territorial connections are planned to be improved through solutions that assure less time between departure and destination. **Low enforcement of building regulations**, in the past several attempts were made to remove those buildings from the site which were built without permission and to limit recreation. **Exploitation of construction materials along the riverbanks without proper impact evaluation** continues to represent a major risk in the case of flash floods, considering that there are obstacles that influence the flood direction and volume. **The existence of areas vulnerable to nitrate pollution**, there is also high eutrophication in the oxbows as a result of pollution from nearby agricultural land (i.e. artificial fertilizers, pesticides, etc.). Another weakness is the **enhancement of permanent pollution**, in the near past the most negative factors affecting the site were the ecological accidents in Romania. Since February 2000 several heavy metals pollution spills have occurred and have caused damage in river ecology. Interfering with the trophic chains, these accidents caused hard intoxication of the Tisa River with potassium cyanide and heavy metals and endangered life in the river and in the groundwater. The social and economic elements acting upon the target area is the **low quality of public and private spaces**, the resort areas located in the floodplain on Tisa River are usually not supplied adequately with public utilities, determining high levels of environmental load which mainly occur during the tourist season.

Opportunities

Spatial/ environment elements:

Rehabilitation of wild junkyards and remediation of contaminated soil. Waste from extractive operations (i.e. waste from extraction and processing of mineral resources) is one of the largest waste streams in the EU. It involves materials that must be removed to gain access to the mineral resource, such as topsoil, overburden and waste rock, as well as tailings remaining after minerals have been largely extracted from the ore. A comprehensive framework for the safe management of waste from extractive industries at EU level is now in place comprising: Directive 2006/21/EC on the management of waste from the extractive industries (the mining waste directive); a Best Available Techniques reference document for the management of tailings and waste-rock in mining activities; and an amendment of the Seveso II Directive to include in its scope mineral processing of ores and, in particular, tailings ponds or dams used in connection with such mineral processing. Directive 2008/98/EC sets the basic concepts and definitions related to waste managament. The revised Waste Framework Directive requires that Member States establish, by 12 December 2013, national waste prevention programmes. These programmes shall be evaluated at least every sixth year and revised as appropriate. They shall be integrated either into the waste management plans or into other environmental policy programmes, as appropriate, or shall function as separate programmes.

Flooding of low meadows along the river. The general EU approach is to “make space for the river”, recognizing the importance of the floodplain in controlling the flooding level, especially in the case of flash floods. The strategies and tools available to prevent problems

and protect people and development from flooding have been developed over many years. Also during the 1960s and 1970s, interest increased in protecting and restoring the environment, including the natural resources and functions of floodplains.

The presence of the waste management national strategy. The National Waste Management Strategy for each country included in this pilot project was developed according to the responsibilities reverting to the invested institutions, following the transposition of European legislation in the field of waste management. The National Waste Management Strategy aims to create the necessary framework for the development and implementation of an environmentally and economically sound integrated waste management system.

Economic/ social elements:

Refer to financial instruments that can be accessed in order to improve the water quality, these two instruments being the *European Regional Development Fund (ERDF)* and *LIFE* programm. Thus the main opportunity elements are the **possibility to develop cross-border waste treatment system,** the **possibility of accessing European funding programs and also national programs** and mainly **Crossborder Cooperation.** Article 29(5) of Directive 2008/98/EC on waste calls upon the Commission to create a system for sharing information on best practice regarding waste prevention and to develop guidelines in order to assist the Member States in the preparation of their waste prevention programmes.

Threats

Spatial/ environment elements:

Intensive and non-sustainable development. Current urbanization and economic developement continue to alter the landscape and the environment, leaving large and often irreversible land-use footprints. Tensions are rising almost everywhere between society's need for resources and space, and the capacity of the land to support and absorb these needs. This is leading to unprecedented changes in landscapes, ecosystems and the environment.

The lack of regulation regarding Natura 2000 sites and **the absence of an integrated monitoring system of the protected areas, including Natura 2000.** The European Union is seeking to ensure biodiversity by conserving natural habitats and wild fauna and flora in the territory of the Member States. An ecological network of special protected areas, known as "Natura 2000", is being set up for this purpose. The network is given coherence by other activities involving monitoring and surveillance, reintroduction of native species, introduction of non-native species, research and education. Yet these sites lack a coherent administration and management plans. With completion of the Natura 2000 network, the management of designated sites will become the priority measure for protecting biodiversity in the EU.

The amplification of deforestation. Growing human demand for natural resources, driven by continuous population growth and increasing individual consumption, has resulted in large-scale land conversion (deforestation, cultivation and urbanisation) and loss of biodiversity. Deforestation is occurring on an alarming scale, Deforestation and improper agricultural management have already led to large-scale soil degradation. A common problem is soil erosion by surface water runoff, which ultimately reduces food production capacity

Environmental hazards such as floods, landslides and avalanches and **high frequency of natural risks (heat waves, flooding).** The number and impacts of disasters have increased in

Europe in the period 1998-2009, as assesed in a new report, by the European Environment Agency (EEA). The increase in losses can be explained to a large extent by higher levels of human activity and accumulation of economic assets in hazard-prone areas, but also, to a smaller extent, by better reporting. Although the share of losses attributable to climate change is currently impossible to determine accurately, it is likely to increase in the future, since the frequency and intensity of extreme weather events are projected to grow.

River ecosystem degradation in the results of water pollution by untreated sewage waters

Improper handling of waste water, is the main reason behind the pollution of water and biodiversity loss. The sewage is drained off in large quantities into rivers. It slows down the process of dilution of the constituents present in the water; which in turn, stagnates the river. These effluents contain innumerable pathogens and harmful chemicals. The detergents that release phosphates in water, help the growth of algae and water hyacinths.

Waste disposal along riverbanks and flood prone area. The absence of proper waste collection and disposal system along the river banks realizes a multi sided threat to the ecological health of the river and it's people. The fragmentation of the floodplain by man made barriers, conssisting of landfills located along the river banks, increase the risk degree, considering the flooding is the most costly hazard.

Economic/ social elements:

Absence of accident situation protocols + FLOOD. The information available on their occurrence and consequences is far from comprehensive and, in particular, there are significant gaps in our understanding of the long-term environmental impacts of accidents. The solution would be an integrated approach, based on a common cross-border system that would improve the efficiency of local measure in the case on flash floods and would make viable any subsequent investment in tourism activities. Although some EU policies have already been adopted or initiated, more effort is needed to implement an Integrated Risk Management (IRM) approach that includes prevention, preparedness, response and recovery for all hazards across Europe. Some measures are best suited to be managed at household or municipal level, such as the improvement of natural drainage to prevent pluvial flooding or suitable care and housing for elderly people that can buffer the effects of heat waves.

➢ **INTERNAL FRAMEWORK**

Strengths		***Weaknesses***	
spatial / environment	Existing network of dikes for flood control	**spatial / environment**	Low connectivity across TISA
	High value of natural and cultural resources		Low enforcement of building regulations
	The high variety of natural protected areas located in the target area		Exploitation of construction materials along the riverbanks without proper impact evaluation
	In upper part of Tisa, the tributaries are of good ecological quality		The existence of areas vulnerable to nitrate pollution
	Good ecological quality of protected areas		Enhancement of permanent pollution
	High share of forest lands in the total area of the region		
	Non industrial character of the economy of the target area determine lower pollution rate		
economic / social		**economic /social**	Low quality of public & private spaces

Table 23. SWOT analysis on Development of sustainable land use in the flood area PiP3 area/Internal Framework

EXTERNAL FRAMEWORK

Opportunities		***Threats***	
spatial/ environment	Rehabilitation of wild junkyards and remediation of contaminated soil	**spatial/ environment**	Intensive and non-sustainable development
	Flooding of low meadows along the river		The lack of regulation regarding Natura 2000 sites
	The presence of the waste management national strategy		The absence of an integrated monitoring system of the protected areas, including Natura 2000
			The amplification of deforestation
			Environmental hazards such as floods, landslides and avalanches
			River ecosystem degradation in the results of water pollution by untreated sewage waters
			Waste disposal along riverbanks and flood prone area
			High frequency of natural risks (heat waves, flooding)
economic/ social	Possibility to develop cross-border waste- treatment system	**economic/ social**	Absence of accident situation protocols + FLOOD
	Possibility of accesing European funding programs and also national programs		
	Crossborder Cooperation		

Table 24. SWOT analysis on Development of sustainable land use in the flood area PiP3 area/External Framework

Analysing both the positive and the less positive aspects of the studied area, it turns out that there are enough resources that can contribute to reaching the establishment of a continuous ecological route (of varied width) on both banks of the river in order to provide a green space and corridor for eco-friendly recreation and tourism; still, there is the need of human presence, in a sustainable manner, in order to bring nature to people and people to nature through its own elements.

The characteristics of an ecological corridor may lead to interpretation of facts in a different manner than usually; for example, if, for most of the situations, lack of a wide range of transportation options would be considered a weakness, in this case this is one of the strengths, as this contributes to the preservation of the natural, unpolluted state of the environment. Transportation would be one of the main sources of pollution in an ecological corridor that river Tisa tends to be considered as. Still, without the use of transportation in the target area, it would be difficult to have thematic routes that follow certain specific aspects of the territory.

Strategy elements

- **Distinctive competences of the studied territory**

  * **Space and environment**:
    - Balanced distribution of resources, both natural and antropic: mountains and rapid water flows in north-east, lower lands and slow water flows in south-west; wood architecture in north-east, castels in south-west; traditional habits in north-west, gastronomy and wines in south-west; in both parts: therapeutical resources, unregulated character of Tisa (resulting an unique natural state in the European river system);
    - Existing forms of protection against floods;
    - Existence of protected areas with good ecological quality;
  * **Social and economy**:
    - General non industrial character of the economy;
    - Navigable sectors in the south-western part and transportation networks enough to assure connections, but not too much in order to still be able to keep a green character of the area;
    - Diverse ethnic structure along Tisa, especially in the northern part of the territory;

- **Diagnosis**

Passing through 5 countries, crossing various landforms and generating various landuses and ways of living, Tisa corridor is at the stage where its future development can be in any direction as there is no common plan reuniting common visions from all the five countries that the river flows through.

- **Vision**

In the next period, Tisa corridor will become an ecological corridor suitable for eco-friendly recreation and tourism along its whole length due to common development policies applied both on micro and macro scale in the five countries that Tisa crosses, it will be preffered by tourists for the various natural and cultural heritage, for the quality local products, for the quality tourism services and infrastructure, things that will be possible to be explored fluently using ecological ways of transportation.

- **Mision**

In order to become an ecological corridor suitable for eco-friendly recreation and tourism, it is necessary to assure people and territory protection in case of specific nature hazards, to increase the capacity of attracting investors and tourists, but also to provide the know-how (regarding ecological corridor and eco-friendly recreation and tourism) among inhabitants and potential investors.

- **Strategic development direction**

Development, through transnational cooperation, of Tisa corridor as strategic green pole, promoting eco-friendly recreation and tourism in Europe.

- **PROBLEM TREE | OBJECTIVE TREE**

Among the four main themes of the project, the issues related to *development of sustainable land use* and *water management and flood control* are subordinated to the ones referring to *biodiversity* and *eco-friendly tourism*. The state of the last two themes is strictly dependent on the state of the first two themes, as there cannot be a healthy biodiversity and a strong eco-friendly tourism in an environment with bad water management and uncontrolled use of land.

Therefore, the objectives related to biodiversity and eco-friendly tourism are the ones that contain all the aspects of the studied area and that contribute the most in achieving the aim of a continuous ecological route (of varied width) on both banks of the river in order to provide a green space and corridor for eco-friendly recreation and tourism.

All of the four main defining themes for PiP3 are influencing each-other. An intensive and unsustainable use of land can have negative impact on water quality, especially through pollution, while floods influence land use either by negative impact or through measures taken in order to prevent them. On its turn, a poor water quality or bad flood management can send pollution further to habitats; biodiversity can also receive negative influences through air pollution, deforestation, illegal fishing and hunting, all of these being effects of a weak control over land use. All these factors combined have a heavy influence on tourism, as only a good state of land use, biodiversity and water aspects can attract visitors and give a proper framework for eco-tourism and recreation. And the circle closes as tourism activities will always influence land use, at least through more or less demands of accessibility or accommodation.

All these inter-relations can be explained as all the four main themes are defined by a combination, in various shares, of elements corresponding to legal framework, human presence and uncontrollable events.

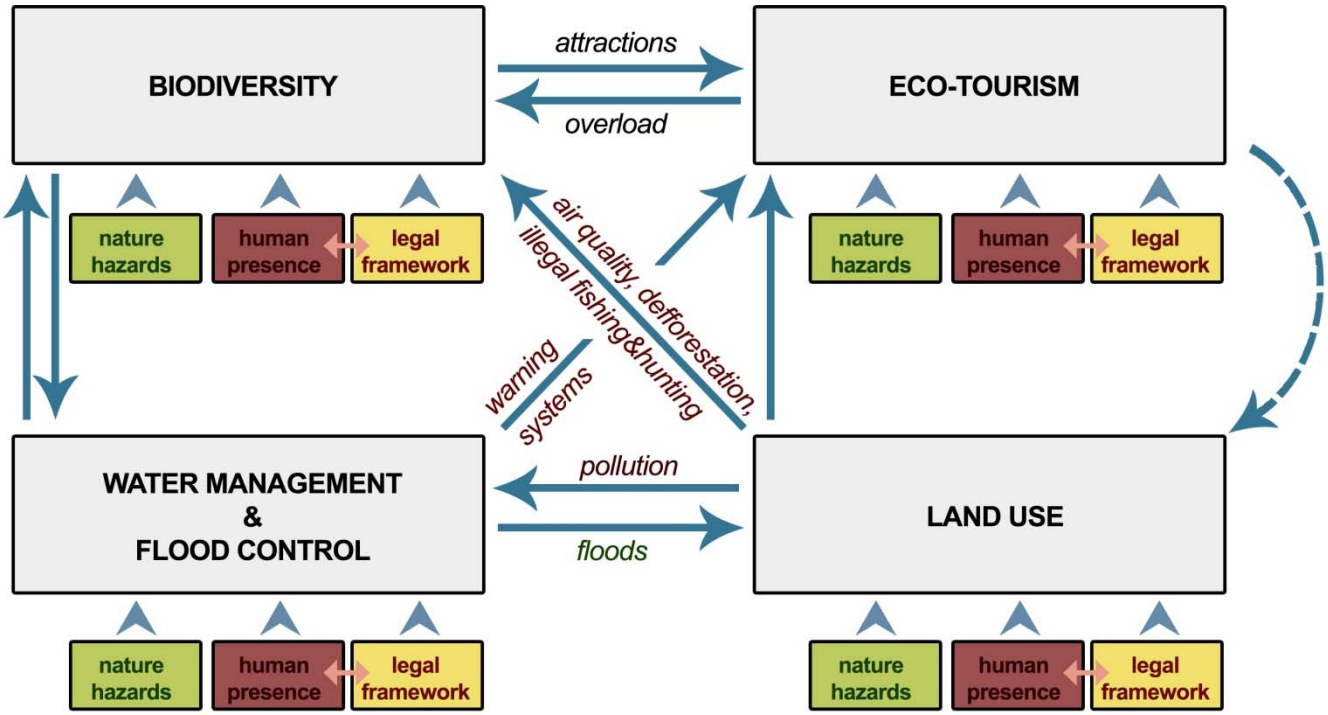
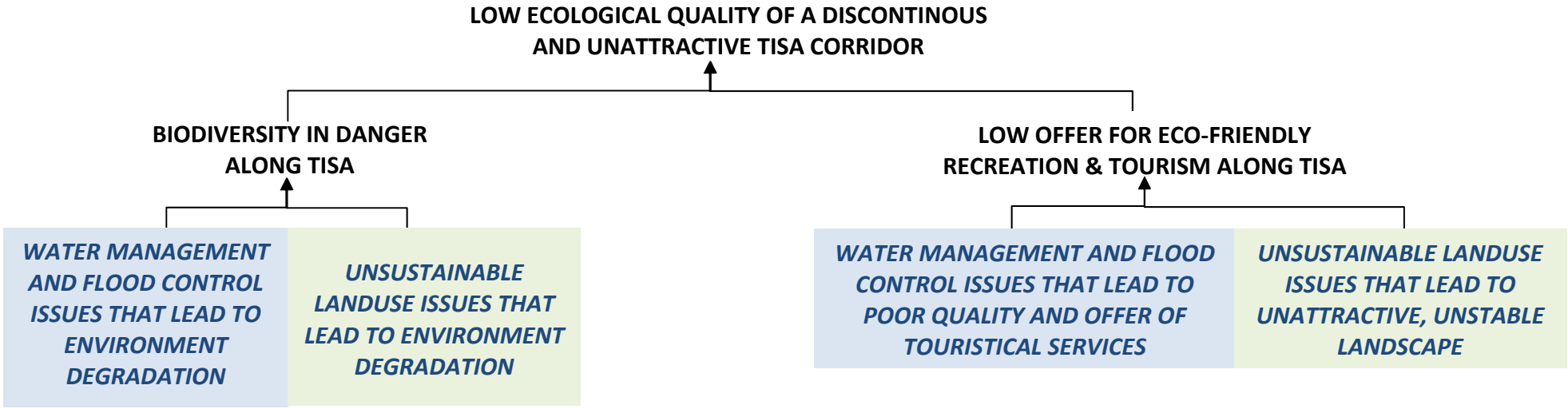


Figure 12. Example of how the four main themes of PiP3 influence each other

Figure 13. *PROBLEM TREE (main "branches")*



and

Figure 14. *OBJECTIVE TREE (main "branches")*

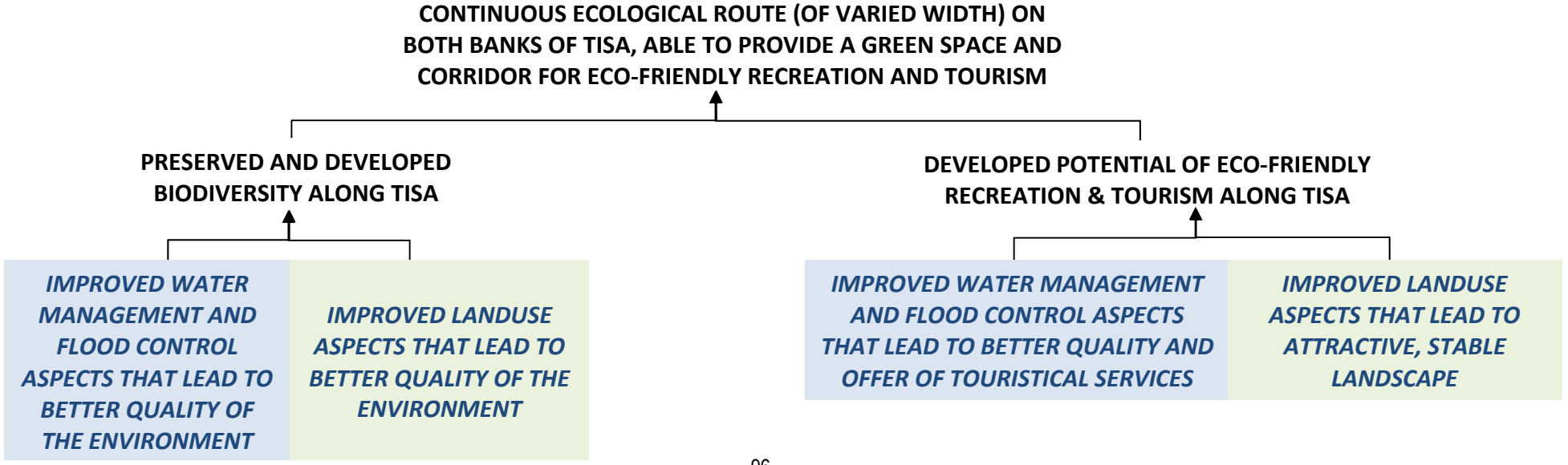


Figure 15. *PROBLEM TREE (with the „roots")*

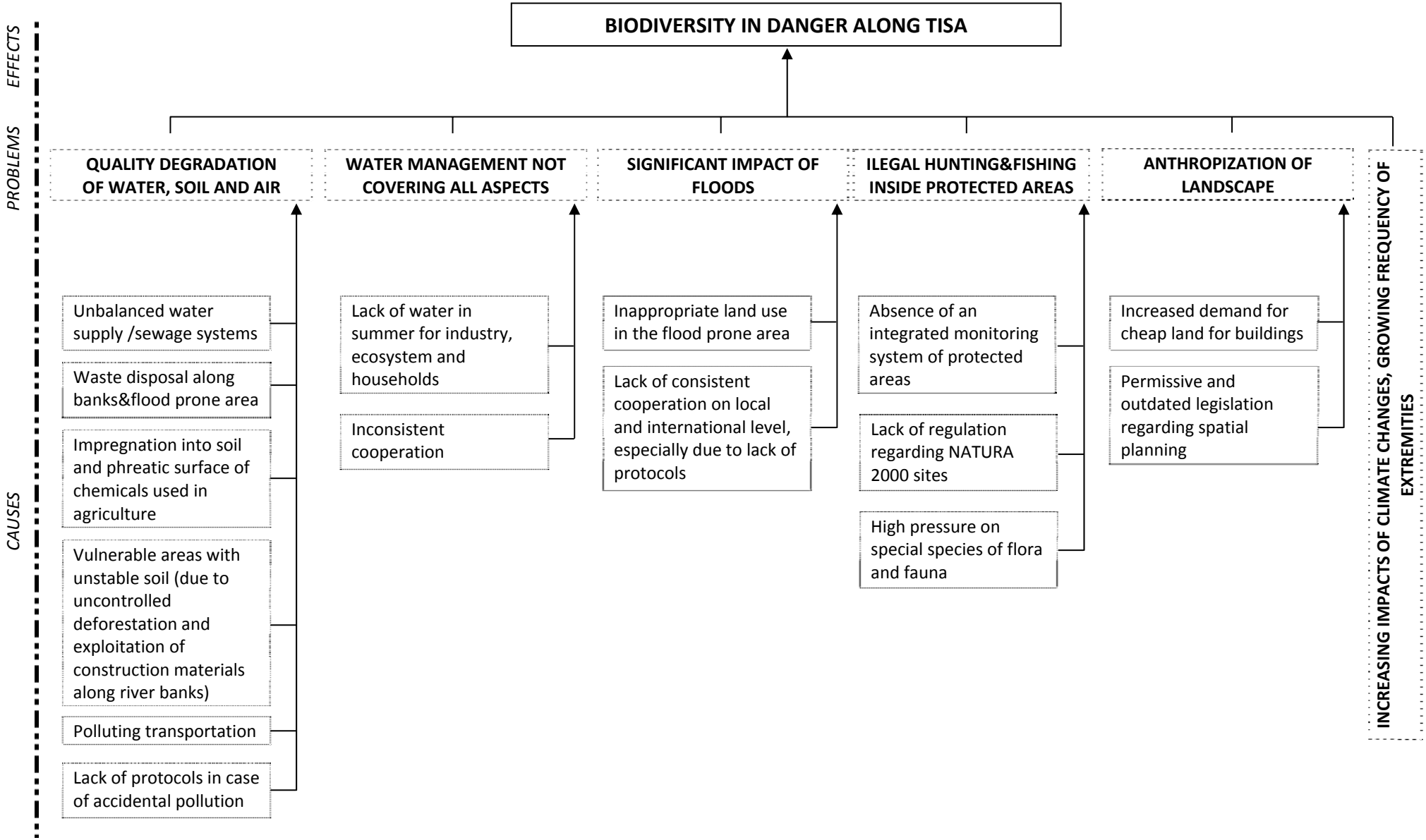


Figure 16. *PROBLEM TREE (with the „roots")*

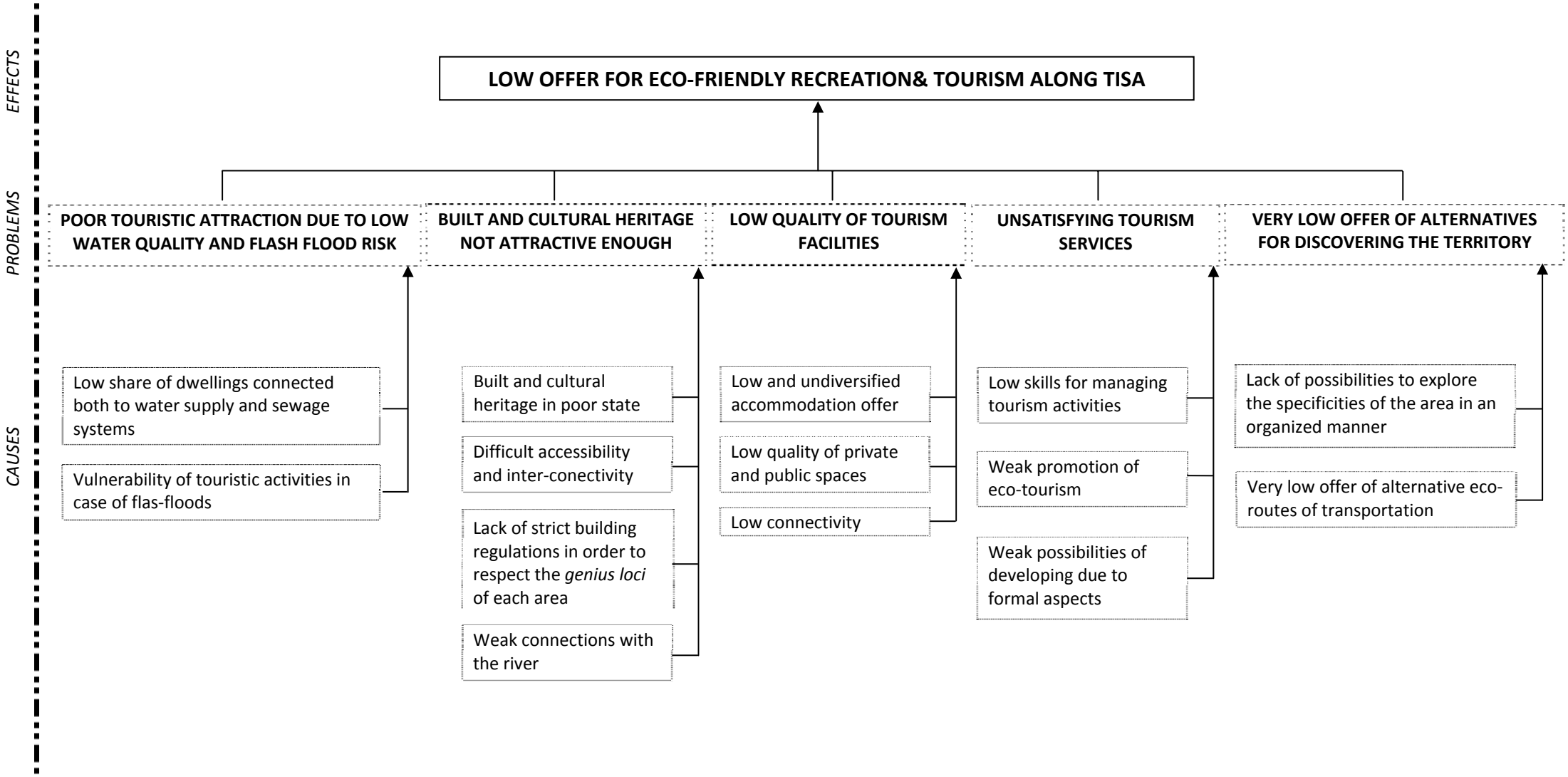


Figure 17. *OBJECTIVE TREE (with the „roots")*

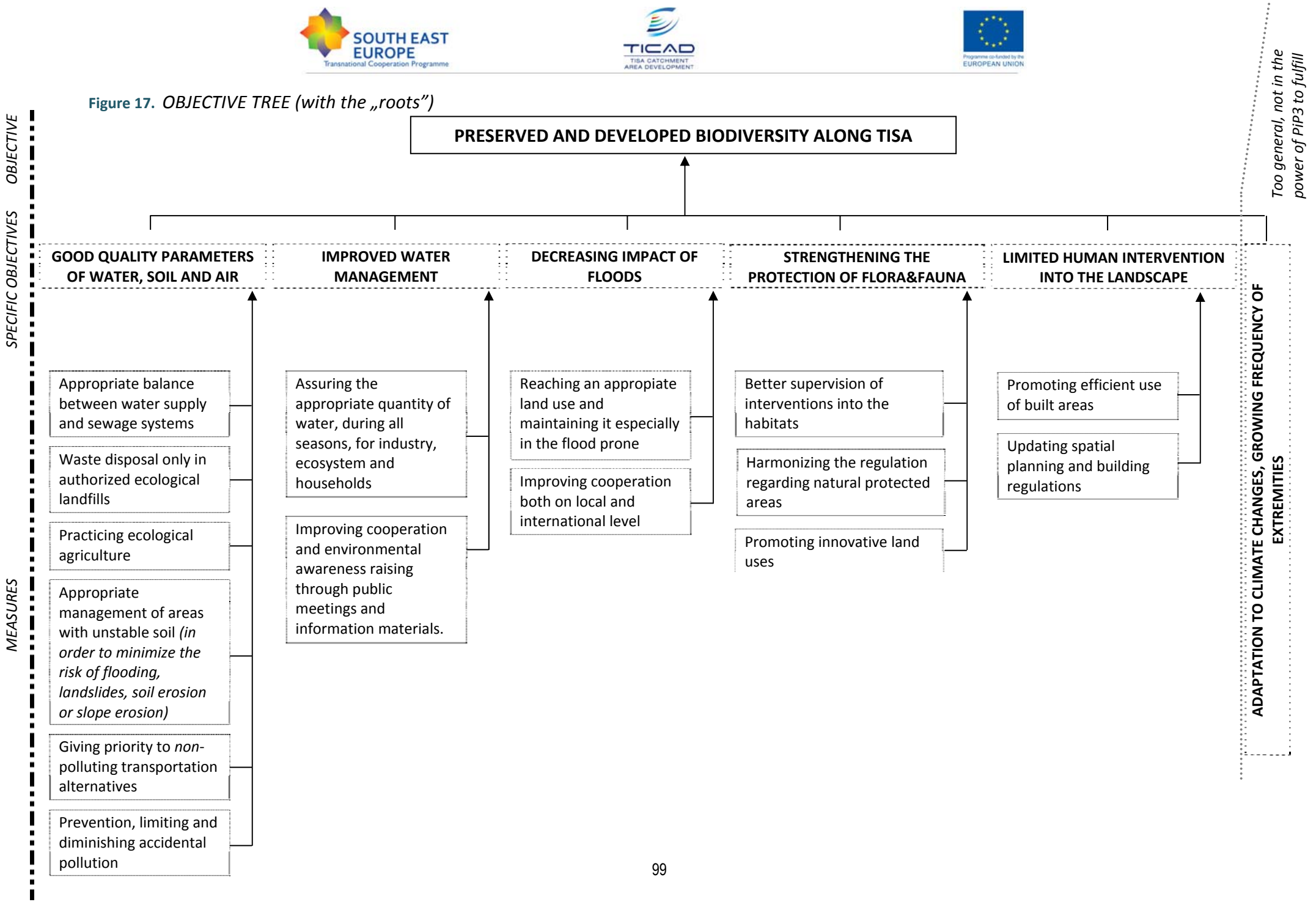
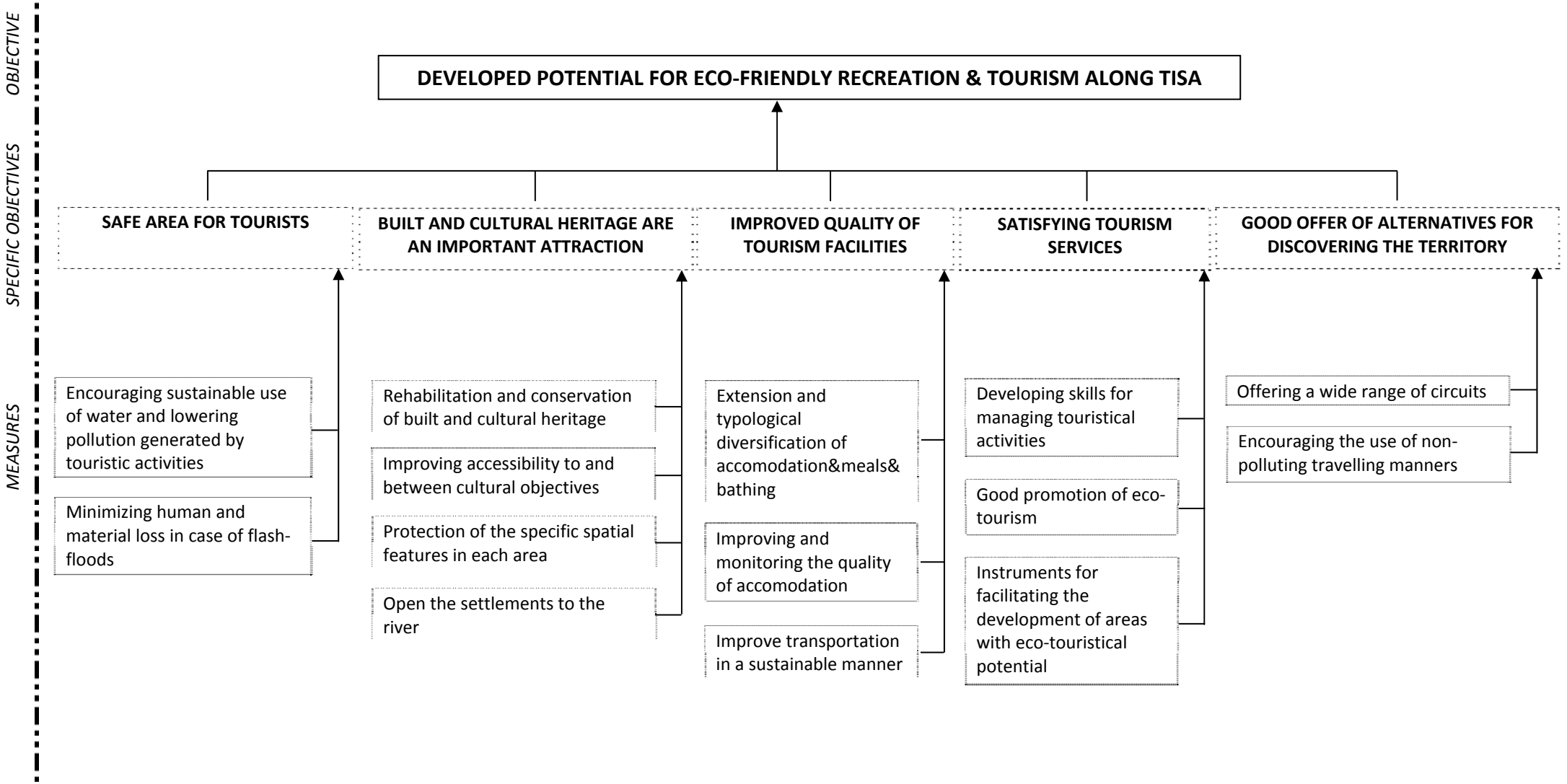


Figure 18. *OBJECTIVE TREE (with the „roots")*



- **Table 25. Objectives, measures and activities**

general objective: CONTINUOUS ECOLOGICAL ROUTE (OF VARIED WIDTH) ON BOTH BANKS OF TISA, ABLE TO PROVIDE A GREEN SPACE AND CORRIDOR FOR ECO-FRIENDLY RECREATION AND TOURISM

main objective: PRESERVED AND DEVELOPED BIODIVERSITY ALONG TISA

Specific objectives/projects	Measures	Activities/Projects	Estimated year of finalisation	Involved or responsible stakeholders	Expected Results
- related to *WATER MANAGEMENT AND FLOOD CONTROL*					
1. Good quality parameters of water, soil and air	**1.a.** Appropriate balance between water supply and sewage systems	▪ Extension/ rehabilitation of water supply and sewage networks. ▪ Installation of treatment plants either individual (for low density areas) and common (for high density areas)[18]. ▪ Implementation and putting into service of water pre-treatment facilities resulting from hospitals (ex.: in Sighetu Marmației, RO)	2012-2015	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for agriculture, rural development, transport, housing and environment including water and land resources management, pollution control	▪ Increased share of dwellings connected both to water supply and sewage systems. ▪ Diminishing water pollution generated by used water. ▪ Cleaner, healthier environment. ▪ Increased safety for population and material assets. ▪ Increased efficiency in the average and long term. ▪ High level of functionality and aesthetics of natural landscapes.
	1.b. Waste disposal only in authorized ecological landfills	▪ Closing and recultivation of non-compliant landfills. ▪ Reclaiming the areas where waste was deposited illegaly.			
	1.c. Practicing ecological agriculture	▪ Enforcing of strict regulations regarding the use of chemicals (pesticides, fertilizers, etc.) by adapting to local climatic conditions. ▪ Promoting the reuse of lifestock manure (transforming it into compost for natural fertilizer)			

[18] Problem that can occur: big ones are not cost effective (after being built, even with EU funds, they are no longer used). SO, EU could support also small scale treatment plants (for only a few grouped dwellings)

		▪ Afforestation in cleared areas.			
	1.d. Appropriate management of areas with unstable soil *(in order to minimize the risk of flooding, landslides, soil erosion or slope erosion)*	▪ Planting in areas with risk of flooding, landslides, soil erosion or slope erosion. ▪ Prohibition and enforcement of regulations related to deforestation. ▪ Eliminating or reducing plowing along the slope. ▪ Increasing the shares of forests (to the detriment of arable lands) in hill or mountain areas. ▪ Strict monitoring of exploitation of construction materials. ▪ More frequent and complex inspections in forest areas (if waste disposal exists, if trees are illegaly cut). ▪ Strict regulation regarding the forest management (ex: during dry periods, preventing fire with fire) ▪ Making a better difference between economic (production) and welfare (qualitative aspect) forests and increasing the share of welfare forests	2015-2020		
	1.e. Giving priority to non-polluting transportation alternatives	▪ Rehabilitation of railway networks and incresing the share of electric railways. ▪ Creating bike routes and dedicated lanes. ▪ Facilitating the use of non-polluting boats. ▪ Increasing the use of multimodal transport (better connections).			

	1.f. Prevention, limiting and diminishing accidental pollution	▪ Elaboration and implementation of joint system regarding prevention and monitoring of hazard situations (Creating an integrated database with possible polluters, pollution types and risks, sources of pollution). ▪ Media coverage of existing data on water, soil and air quality.			
2. Improved water management	**2.a.** Assuring the appropriate quantity of water, during all seasons, for ecosystem and households	▪ Setting water retention systems (storage capacity, drainage systems, wetlands). ▪ Afforestation in the upstream area, protection of forest and grassland in the lowland area.	<2030	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for the environment including water management and the forestry	▪ Very good parameters of water quality ▪ Increased public awareness
	2.b. Environmental awareness raising through public meetings and information materials	▪ Improving cooperation both on local and international level (school programs, exchange of students and teachers, joint seminars for public officials) ▪ Interactive and alternative means of information (websites, flyers, TV spots etc) ▪ Elaboration and implementation of joint monitoring system (related to the previous mentioned one).			

3. Decreasing impact of floods	**3.a.** Reaching an appropriate land use and maintaining it especially in the flood prone	▪ Widening the flood plains (=buffer zone = area between dikes). ▪ Land use change between the dykes. ▪ Flood retention reservoirs on the flood protected areas (strongly connected to 2.a). ▪ River bed reservoirs.	<2030	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for the spatial and urban planning, the environment particularly water management	
	3.b. Improving cooperation both on local and international level	▪ Harmonization of legislation regarding flood management. ▪ Implemetation of joint monitoring system[19]			
- **related to *DEVELOPMENT OF SUSTAINABLE LANDUSE IN THE FLOOD AREA***					
4. Strengthening the protection of flora&fauna	**4.a.** Better supervision of interventions into the habitats	▪ Prohibition of marketing of protected&rare animals. ▪ Common transnational legislation regarding the protected species, especially the protected fish where Tisa is border between countries.	2015-2020	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for agriculture and the environment including forestry	▪ Increased number in the population of protected species
	4.b. Harmonizing the regulation regarding natural protected areas				
	4.c. Promoting innovative land uses	▪ Aquaculture farms (fish, frogs, water flowers)			
5. Limited human intervention into the landscape	**5.a.** Promoting efficient use of built areas	▪ Rehabilitation of degraded urban areas. ▪ Rehabilitation of abandoned or degraded buildings. ▪ Facilities granted for rehabilitation instead of building on a new plot.	2012-2015	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for the spatial and urban planning	▪ Coherent urban fabric. ▪ High share of natural landscape.
	5.b. Updating spatial planning and building regulations	▪ Review of the legislation on national level. ▪ Promoting innovative urban planning. ▪ Enforcement of spatial planning and building regulations.	2015-2020		▪ Clear and comprehensive legal framework regarding spatial planning.

[19] Related to the prevoius one

main objective: DEVELOPED POTENTIAL FOR ECO-FRIENDLY RECREATION & TOURISM ALONG TISA					
- **related to related to *WATER MANAGEMENT AND FLOOD CONTROL***					
6. Safe area for tourists	**6.a.** Encouraging sustainable use of water and lowering pollution generated by tourism activities	▪ Installation of treatment plants either individual (for low density areas) and common (for high density areas). ▪ Increasing the number of dwellings connected to water supply and sewage systems. ▪ Periodical testing of drinking water quality. ▪ Encouraging the use efficient systems for saving water: intake of rain water, water recovery and recirculation. ▪ Selective waste collection in public areas. ▪ Public reports and examples of good practices on reuse of waste.	2012-2015	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for the spatial and urban planning, housing, protection of population from emergencies	▪ Low number of accidents due to flash-floods ▪ Very good parameters of water quality ▪ Increased public awareness
	6.b. Minimizing human and material loss in case of flash-floods	▪ Joint warning systems in case of floods. ▪ Forbidding building on the river banks and supplementing safety for the ones already built in the risk area. ▪ Raising awareness regarding flood (tourists and local population).			
- **related to *DEVELOPMENT OF SUSTAINABLE LANDUSE IN THE FLOOD AREA***					
7. Built and cultural heritage are an important attraction	**7.a.** Rehabilitation and conservation of built and cultural heritage	▪ Conservation of traditions and local traditional products (handicrafts etc.): *- Planning and development of craft centers/workshops (weaving, wood and wool processing, making of twig baskets and hay hats etc);* *- The setting up of points of sale for handicraft, craft and souvenir products in the neighbourhood of these centres/workshops and also in other settlements in order to have a good*	2012-2015	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for the spatial and urban planning, protection of cultural heritage, tourism	▪ Increased number of tourists

		marketing of the area; *- Identification of such local opportunities and taking over of the projects from the preliminary studies, preparation of EU-funded projects and their integration in the tourism offers (visit / purchase);* ▪ Protection and conservation of specific architecture: *- Specialized consulting (with an architect) for the activities involving construction renovations;* *- Partial support for the beneficiary by granting discounts (using the principle: higher demand for one architect, lower prices).*			
	7.b. Improving accessibility to and between cultural objectives	▪ Organizing special bus routes for connecting cultural objectives (situated in different neighbouring settlements), with departure points from the important settlements in the area. ▪ Organizing sight-seeing tours in the settlements with a wider offer of cultural objectives. ▪ Leisure boat tours. ▪ Ellaboration and providing of touristical maps. ▪ Offering better prices for packages that alow visiting more monuments than taking tickets separatelly for less of them.			
	7.c. Protection of the specific spatial features in each area	▪ Improvement of legislative framework on national level. ▪ Elaboration of spatial planning documents for protected areas on local level, including recommendations for development			

		(recommending strategic development projects).			
	7.d. Open the settlements to the river	▪ Creating pedestrian areas along the river. ▪ River front landscaping in a countinous manner between settlements (network) to enhance ecological route.			
8. Improved quality of tourism facilities	**8.a.** Extension and typological diversification of accomodation & meals & bathing	▪ Increasing rural accomodation. ▪ Setting up of properly designed and equipped tourism chalets in the mountain areas with a high potential (including the protected natural areas or those areas that should have this status). ▪ Network of camping sites for tents and caravans (connected to power supply, water and sewerage + related services). ▪ Creation of accommodation alternatives to the existing accommodation units (guesthouses and hotels): *- holiday houses: may be ratified as "apartments or rooms for rent in family homes or buildings with other destination"* *- the concept of accommodation at friends (yet not approved: with families, at the priest, in hay) and the inclusion of these information on sites, panels, within the tourist information centres and at info-kiosks.*	2015-2020	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for the spatial and urban planning, tourism ▪ Business environment ▪ Private sector ▪ NGOs	▪ Increased number of tourists ▪ Increased number of accomodation units ▪ Increased number of spent nights ▪ Joint internet database
	8.b. Improving and monitoring the quality of accommodation	▪ Harmonizing and informing about the rules regarding spatial parameters for accomodation units (maximum built surface, minimum green area/room area, minimum number of beds & parking places, distances between buildings etc).			

		▪ Setting a joint system for classification of accomodation units.			
	8.c. Improve transportation in a sustainable manner	▪ Creating alternative transportation routes (for bikes, non-polluting boats). ▪ Parking facilities (with info-points, shops) off the river front.			
9. Satisfying tourism services	**9.a.** Developing skills for managing touristical activities	▪ Setting standards for tourism managers and periodical testing. ▪ Organizing periodical classes for improving language skills. ▪ Raising awareness among inhabitants regarding the touristic potential of their surroundings, in order to improve hospitality skills. ▪ Organizing periodical workshops and fairs for tourism managers.	2012-2015	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for tourism ▪ Business environment ▪ Private sector ▪ NGOs	▪ Increased number of tourists ▪ Increased number of accomodation units ▪ Increased number of spent nights ▪ Joint internet database

	9.b. Good promotion of eco-tourism	▪ Setting of transnational tourism associations (networks). ▪ Elaboration of comprehensive guides (both on paper and web-sites) able to offer information both on local and on general scale. ▪ Organizing periodical meetings between stakeholders. ▪ Creating a transnational network of tourist info-points. ▪ Signposting of tourism trails, resting-places, places for regrouping, panoramic sites etc. ▪ Creating web-sites for on-line booking of touristic package. ▪ Partnership with touristic agencies, media and other stakeholders for mutual promotion.			
	9.c. Instruments for facilitating the development of areas with eco-touristical potential	▪ Encourage local administration and inhabitants to obtain the status of tourism resort of local interest for settlements with potential.			
10. Good offer of alternatives for discovering the territory	**10.a.** Offering a wide range of circuits	▪ Establishing and signaling thematic routes: *- CULTURAL ROUTE: renaissance, secession, gothic,* *- PILGRIMAGE* *- The tour of villages having a well-preserved specificity* *- The tour of wooden churches* *- The tour of monasteries* *- The tour of handicraft workshops* *- Wine route* *- Plum brandy route*	2015-2020	▪ Ministries from all five countries and local authorities from relevant territorial units responsible for tourism ▪ Business environment ▪ Private sector ▪ NGOs	▪ Increased number of tourists ▪ Well preserved monuments

		- *Gastronomy route* - *Salt road* ▪ Setting up and development of ecological tourism farms based on local and regional specificities. ▪ Development of facilities for the practice of winter sports. ▪ Organizing thematical trips inside protected areas, for small groups, guided by specialists.			
	10.b. Encouraging the use of non-polluting travelling manners	▪ Transnational network of bicycle routes with possibility of using rent and drop system. ▪ Encouraging navigation using non-polluting crafts. ▪ Paragliding, parachute, hot air baloon. ▪ Horse riding and chariot routes. ▪ Leisure boat routes ▪ Swimming			

- **Implementation of measures / activities through specific projects:**

  - ***Regarding specific objective no 7: Built and cultural heritage are an important attraction***

Measure	Activities generally available for all TICAD countries
7.a. Rehabilitation and conservation of built and cultural heritage	▪ Conservation of traditions and local traditional products (handicrafts etc.): *- Planning and development of craft centers/workshops (weaving, wood and wool processing, making of twig baskets and hay hats etc);* *- The setting up of points of sale for handicraft, craft and souvenir products in the neighbourhood of these centres/workshops and also in other settlements in order to have a good marketing of the area;* *- Identification of such local opportunities and taking over of the projects from the preliminary studies, preparation of EU-funded projects and their integration in the tourism offers (visit / purchase);* ▪ Protection and conservation of specific architecture: *- Specialized consulting (with an architect) for the activities involving construction renovations;* *- Partial support for the beneficiary by granting discounts (using the principle: higher demand for one architect, lower prices).*

Possible projects in Ukraine:

* Elaboration and approving The Program on Conservation and Use of Castles of Ukraine;
* Awarding individual grants to Ukrainian experts in cultural heritage for measurement and examination of heritage;
* Establishing of a control system on housing purchase, changes in traditional view of houses and destruction of a planning structure of central historically valuable parts of settlements;
* Preparing the documentation and carry on negotiations with the experts from UNESCO World Heritage Centre concerning including some cultural objects of Zakarpatska Oblast to UNESCO World Heritage List.

- ***Regarding specific objective no 8: Improved quality of tourism facilities***

Measure	Activities generally available for all TICAD countries
8.a. Extension and typological diversification of accomodation&meals	▪ *Rural accomodation.* ▪ *Setting up of properly designed and equipped tourism chalets in the mountain areas with a high potential (including the protected natural areas or those areas that should have this status).* ▪ *Camping sites for tents and caravans(connected to power supply, water and sewerage + related services).* ▪ *Creation of accommodation alternatives to the existing accommodation units (guesthouses and hotels):* *- holiday houses: may be ratified as "apartments or rooms for rent in family homes or buildings with other destination"* *- the concept of accommodation at friends (yet not approved: with families, at the priest, in hay) and the inclusion of these information on sites, panels, within the tourist information centres and at info-kiosks.*

Possible projects in Romania:

* Extension and the increase in quality of the accommodation infrastructure at the level of rural guesthouses: Săpânța, Rona de Jos, Tisa, Sarasău and Câmpulung la Tisa
* Creation of a 100 places camping site at Săpânța (including areas for tents and caravans, connected to power supply, water and sewerage + related services)
* Creation of a 200 places camping site at Coştiui (including areas for tents and caravans, connected to power supply, water and sewerage + related services)
* Setting up of tourism chalets in the gorges of Frumuşeaua Valley (40 beds)
* Setting up of a tourism chalet (40 beds) in Țiganu Peak- Strungi Waterfall area (the existing chalet in Agriş area is undersized and does not have the proper conditions for tourism at present-day standards)
* Setting up of a tourism chalet (40 beds) in Covătari Waterfall area along Runc River
* Setting up of a tourism chalet (50 beds) at the exit of Săpânța River out of the gorge sector

- ***Regarding specific objective no 9: Good offer of alternatives for discovering the territory***

Measure	Activities generally available for all TICAD countries
9.b. Good promotion of eco-tourism	▪ *Setting of transnational tourism associations (networks).* ▪ *Elaboration of comprehensive guides (both on paper and web-sites) able to offer information both on local and on general scale.* ▪ *Organizing periodical meetings between stakeholders.* ▪ *Creating a transnational network of tourist info-points.* ▪ *Signposting of tourism trails, resting-places, places for regrouping, panoramic sites etc.* ▪ *Creating web-sites for on-line booking of touristic package.* ▪ *Partnership with touristc agencies, media and other stakeholders for mutual promotion.*

Possible projects in Romania:

* The presentation on the project site (http://www.see-ticad.eu/) of tourism information by means of a portal grouping:
  - natural and anthropogenic attractive resources
  - information about attractions and events
  - links to detailed information regarding interesting tourism components (e.g. attractive resources, events, accommodation and leisure-entertainment facilities etc.)
  - the catalogue of tourism operators including contact data and the homogeneous presentation of the contents using a common logo (motto)
  - periodical checks within the group work of the existing capacities and/or new services and of those which are no longer available
* Sending the information included on the site to County Tourism Association, Regional Development and Tourism Ministry and to other interested institutions, economic operators or NGOs in the shape of a newsletter after every updating of the information and of the product range
* Periodical debates involving tourism operators (travel agencies, guides, suppliers of tourism services etc)
* Periodical meetings for debates and individual presentations within the tourism-cultural group. The topics of interest should have in view:
  - the characteristics of tourism demand
  - the degree of occupancy
  - the manner in which resources should be adapted or diversified in order to correspond to new trends
  - what the local trends are etc.

- ***Regarding specific objective no 10: Good offer of alternatives for discovering the territory***

Measure	Activities generally available for all TICAD countries
10.a. Offering a wide range of circuits	▪ Establishing and signaling thematic routes: *- The tour of villages having a well-preserved specificity* *- The tour of wooden churches* *- The tour of monasteries* *- The tour of handicraft workshops* *- Wine route* *- Plum brandy route* *- Gastronomy route* *- Salt road* ▪ Setting up and development of ecological tourism farms based on local and regional specificities. ▪ Development of facilities for the practice of winter sports. ▪ Organizing thematical trips inside protected areas, for small groups, guided by specialists.

Possible projects in Romania:

* The tour of wooden churches in Maramureş land, which should also include the wooden churches within the analysed area (especially Săpânța-Peri)
* The tour of Maramureş monasteries, integrating the monasteries of the analysed area (Săpânța-Peri and Rona de Jos)
* The salt road (starting in Coştiui salt mine to other similar locations in Maramureş Land - Ocna Şugatag - or outside the region: Dej-Turda-Ocna Mureş-Ocna Sibiului etc.)
* The tour Huta Pass-Săpânța-Sighetu Marmației-Vadu Izei-Valea Stejarului-Coştiui-Rona de Sus-Rona de Jos- Crăciuneşti-Sighetu Marmației (with the alternative Bîrsana-Petrova-Bistra-Rona de Sus-Rona de Jos-Crăciuneşti-Sighetu Marmației)
* The tour Săpânța-Sighetu Marmației-Vadu Izei-Onceşti-Bârsana-Budeşti-Călineşti-Ocna Şugatag-Vadu Izei-Sighetu Marmației
* The tour Săpânța-Sighetu Marmației-Vadu Izei-Bârsana
* The tour Săpânța-Sighetu Marmației-Vadu Izei-Ocna Şugatag-Hoteni-Deseşti
* Setting up of an ecological sheepfold or cowshed on Igniş Plateau between Țiganu Peak and the upper sector of Săpânța River
* Setting up of an ecological sheepfold or cowshed in Pop Ivan-Tomnatecu area of Maramureş Mountains
* Setting up of a horse stud farm on Igniş Plateau between Țiganu Peak and the upper sector of Săpânța River
* Setting up of a mule stud farm in Săpânța at the exit of the river from the gorges
* Setting up of a mule stud farm in Pop Ivan-Tomnatecu area of Maramureş Mountains
* Identification and planning of start and finish sites of trip tours (on foot, by bicycle, horse riding etc.) and their blazing with waymarks, resting places and panoramic sites)
* Development of facilities for ski in the upper sector of Săpânța River and Țiganu-Agriş area by activating the Firiza-Săpânța road axis (ski slopes and accommodation units – hotels, chalets and campings – having a capacity of at least 500 beds
* Development of ski facilities in the upper sector of Frumuşeaua Valley (Pop Ivan-Tomnatecu area)

Recommendation on the development of the ecological network and the sustainable recreational use of it

Through TICAD, the boundaries between countries will be weakened when referring to disparities. **Common objectives can be reached by following a common matrix, using an integrated approach, assuring a continuous alternation between small scale (local, NUTS 5 level), medium scale (PiP3 territory) and large scale (TICAD territory); any action taken at one of the levels will have a reaction at the other levels. Better communication can lead to a better understanding of the similarities, differences and specificities; communication and cooperation needs to be settled on local, regional and transnational level; they start on micro level and are sustained on macro level (by policies).**

In order to emphasize the strengths of the target area, the weaknesses should be solved, offering the possibility to build on a healthy background; legal, methodological and technical frameworks are opportunities that allow common intervention and monitoring plans, while threats can be more or less predicted and prevented.

The basis for preservation and development of biodiversity and also for a sustainable development of ecotourism and eco friendly recreation is assured by a good control on water management and flood control and also by assuring a sustainable development of land use. A wide range of programs on national and European Union level can offer ideas and financing; most often, they require cooperation among institutions, among settlements (even from different countries) in order to minimize territorial disparities, in order to identify common problems, common solutions (even if, due to specificities, they can be implemented with different actions). National legislation (in conformity with EU legislation) and strategies are the background for implementing projects; legal framework regarding protected areas should be enforced and harmonized on a transnational level; harmonization is also necessary regarding legislation for flood and waste management, protected species. Harmonization of the legal framework is not an easy aspect, as in TICAD project there are EU and non-EU countries.

Flood risk management plans should focus on prevention, protection and preparedness[20]. When referring to land use in relation to flood control, measures that are likely to be more cost-effective than traditional grey infrastructure (such as dams and dikes) include the preservation and restoration of floodplains (including reverting arable land into flood meadows, fostering biodiversity). Waste management plans should minimize the environmental load which is generated by household consumption and industrial production. Besides improved technologies destined to reduce waste impact upon the biodiversity, community information and education is a key instrument in coping with this issue.

Threats are more related to uncontrollable events such as climate change or environmental hazards (floods, landslides, avalanches), they are even related to the degree of awareness of dangers and to human will of respecting or not the legal framework, of improving it or not (inside PiP3 area there are situations of illegal hunting and fishing, uncontrolled deforestation, untreated sewage water lack of legislation). The need for development through improvement of territorial connections can be a threat for the

[20] DIRECTIVE 2007/60/EC on the assessment and management of flood risks (space for the river).

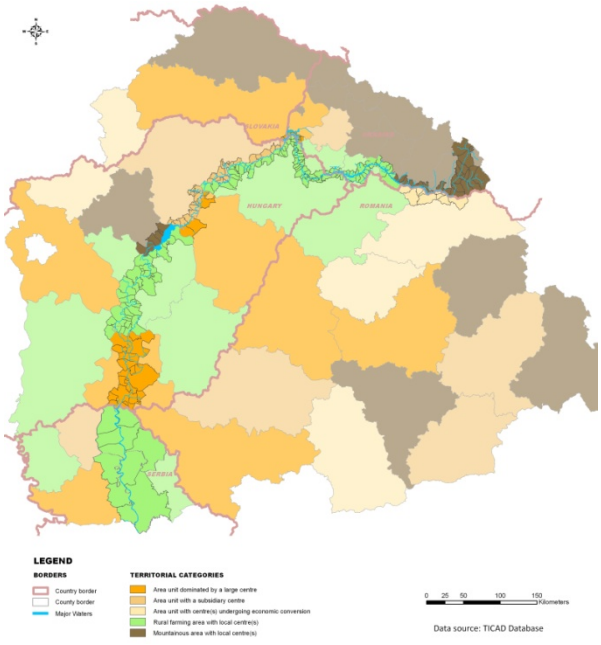
ecological corridor, as a more dense road network can bring advantage on a large scale, but in the target area it would bring more pollution (in the air, in the water, visual, acoustic) generating ecological barriers.

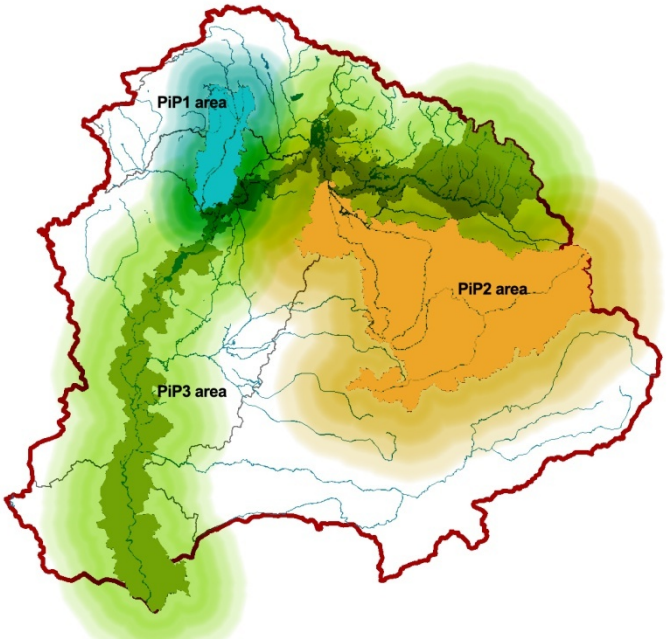
CONCLUSION

The target area gathers all the types of territorial categories identified for whole TICAD area; therefore, the proposed objectives, measures and activities will help achieving the general goals; also, the large scale objectives will influence the territorial coherence of the ecological corridor.

What will identify PiP3 settlements among the others in similar territorial categories is the opportunity of their cooperation along an ecological corridor.

Tisa is the core of TICAD project, and the corridor along it acts like a green zipper that gathers common interests and promotes stability. It is not a barrier, it is a place where integrated and transnational development can be implemented, where diversity can be explored.





The drainage network in Romania

Vişeu River has a catchment area of 1581 km^2 and a length of 82 km. It springs from Maramureş Mountains, in the area of Prislop Pass at a height of 1535 m and drains the SW slopes of these mountains and the northern slopes of Rodna Mountains, by means of its right-hand tributaries *Cisla*, *Vaser, Ruscova* and *Frumuşeaua*. The average slope of this catchment area is 15‰ and the average density of the drainage network is 0.5-0.7 km/km^2.

Iza River has a catchment area of 1293 km^2 and a length of 80 km. It springs from Rodna Mountains at a height of 1275 m and collects a series of tributaries originating from Ţibleş and Gutâi Mountains (*Boicu*, *Ieud, Botiza, Mara* with *Cosău* and *Rona*). The average slope is 13‰ and the average density of the drainage network is 0.6-0.7 km/km^2.

Săpânţa River has a catchment area of 145 km^2 and a length of 13 km. The average slope of the main stem is 48‰. The most important tributaries are *Runcul*, *Trei Săpânţe* rivulet and *Belmezul*.

Baia River has a catchment area of 17 km^2 and a length of 8 km. The average slope of the river is 95‰.

Valea lui Francisc River has a catchment area of 24 km^2 and a length of 10 km. The average slope of the river is 72‰

Apart from the five major left-hand tributaries, Tisa collects other smaller rivulets: *Valea Iepii (Valea Păstăilor), Sarasău, Valea Bic* and *Saroşul*. Along the border sector, Tisa also received tributaries from Ukraine, which are quite important from the point of view of discharge: *Kosovskaia Valley*, *Apşiţa* River and *Teresva* Valley, but also tributaries with a low discharge: *Kuzi Rivulet, Svinskii Rivulet, Sopurka Valley, Teaceveţ* and *Martos.*

The underground water bodies

The underground water bodies have been delimited taking into account the stipulations of the *Council Directive 60/2000 /EC*, only taking into consideration the areas where there are significant aquifers for water supplies with exploitable discharges higher than 10 m^3/day. At the level of the Romanian territory of Tisa catchment area, three underground water bodies have been identified (table 1).

Table 1. The distribution of underground water bodies within Tisa catchment area

Symbol	Location	Area
ROSO02	Iza and Vişeu Rivers	508
ROSO03	Maramureş Basin	207
ROSO17	Lower Tur Plain	134

Note: RO = country code; SO = Someş – Tisa Water Department;
01= number of water body within Someş - Tisa Water Department.

The surface water bodies

Out of the 25 ecoregions defined on European continent, the territory associated to Tisa ecological corridor is located within *Ecoregion 10 – Carpathian Mountains*. For the abiotic typological characterisation of water courses, a series of specific parameters have been

used: the altitude of the catchment area, geological characteristics, the area of the drainage basin, the lithological structure of the river bed, the multiannual average specific discharge, the minimal monthly average specific discharge with an annual probability of 95%, the climatic characteristics, the average slope of the water course. The 22 analysed water courses belong mainly to the RO 01 type (13 streams), followed by RO 03 type and RO 19 type (3 streams each). The types RO 02 and RO 18 are the least representative, as only one water course is associated to each of them (tables 2 and 3, fig. 1 and 2).

Abiotic type of river	Symbol	No. of rivers	Total length (km)	Average length (km)
Water course situated in the mountains, foothills or high plateaus	RO 01	13	121,34	9,33
Sector of water course situated in the foothills or high plateaus	RO 02	1	12	12
Sector of water course situated in mountain basins	RO 03	3	46,38	15,46
Sector of water course situated in the hills or plateaus	RO 05	1	61	61
Temporary water course situated in the foothills or high plateaus	RO 18	1	1,2	1,2
Temporary water course situated in the hills or plateaus	RO 19	3	21.45	7,15
TOTAL		**22**	**263.37**	**17.69**

Table 2. The abiotic typology of the water courses within Tisa ecological corridor

The Romanian sector of Tisa River has been assigned to RO 05 type, according to the abiotic classification.

Abiotic type of river	Symbol	Water bodies - rivers
Water course situated in the mountains, foothills or high plateaus	RO 01	Frumuşeaua, Bistra, Coşeu, Mara, Valea Blondă, Şugău, Valea Iepii, Belmezeu, Săpânța, Runcul, Trei Săpânții, Baia, Valea lui Francisc (Şugătagu Mare)
Sector of water course situated in the foothills or high plateaus	RO 02	Vişeu
Sector of water course situated in mountain basins	RO 03	Iza, Rona, Sărata
Sector of water course situated in the hills or plateaus	RO 05	Tisa
Temporary water course situated in the foothills or high plateaus	RO 18	Turcatele
Temporary water course situated in the hills or plateaus	RO 19	Sarasău, Bic, Saroş

Table 3. Names of water courses within Tisa ecological corridor, classified according to the abiotic criterion

Ecological state of water bodies

At the level of the Romanian territory of Tisa ecological route, four types of water bodies associated to different ecological states of the rivers have been identified. A number of 22 water bodies with a total length of 264 km and an average length of 17.69 km have been analysed (table 4). From the assessment of the data within *The Management Plan of Someş* -

Tisa Catchment Area, it comes out that a high weight of water bodies reaching a good ecological state have an average or low confidence. The other water bodies only reach a moderate chemical state, having an average or low confidence.

Table 4. Ecological state of water bodies within Tisa ecological corridor

Ecological state	No. of water bodies	Total length (km)	Average length (km)
Good ecological state/average confidence	1	5	5
Good ecological state/low confidence	12	161,61	13,46
Average ecological state/average confidence	3	40,6	13,53
Average ecological state/low confidence	6	56,16	9,36
TOTAL	**22**	**263,67**	**10,33**

The territory belonging to Tisa ecological corridor comprises surface water bodies associated to rivers that entirely reach **a good chemical state**, without exception.

Basic characteristics of NUTS5 units within the target area of the Pilot Project "Ecological route on both banks of the Tisa" in Ukraine

No.	NUTS5 unit name	Population	Share in total population, %	Share in total area, %	Ratio of share in total population to share in total area
Uzhorodskyi Region					
1	Chop city	8872	3,32	0,30	11,0
2	Badalivska village council	1714	0,64	0,60	1,1
3	Esenska village council	1677	0,63	0,53	1,2
4	Solomonivska village council	1387	0,52	0,92	0,6
5	Solovkivska village council	1240	0,46	1,01	0,5
Berehivskyi Region					
6	Chetfalvivska village council	599	0,22	0,38	0,6
7	Halaborska village council	752	0,28	0,28	1,0
8	Tysaashvanska village council	1129	0,42	0,58	0,7
9	Varivska village council	3147	1,18	1,22	1,0
Vynohradivskyi Region					
10	Vynohradivska city council	25435	9,51	2,26	4,2
11	Korolivska settlement council	8835	3,30	0,65	5,1
12	Vylocka settlement council	3326	1,24	0,43	2,9
13	Chepivska village council	3224	1,21	1,08	1,1
14	Chornotysivska village council	2947	1,10	1,83	0,6
15	Drotynska village council	2000	0,75	0,53	1,4
16	Fanchykivska village council	4405	1,65	1,11	1,5
17	Malokopanska village council	1360	0,51	0,23	2,2
18	Novosilska village council	1865	0,70	0,55	1,3
19	Pyjterfolivska village council	5122	1,92	2,04	0,9
20	Sasivska village council	2281	0,85	0,84	1,0
21	Tekivska village council	2138	0,80	0,96	0,8
22	Velykokopanska village council	3457	1,29	0,91	1,4
23	Veryacka village council	2647	0,99	0,50	2,0
Tyachivskyi Region					
24	Tyachivska city council	9191	3,44	1,65	2,1
25	Bushtynska settlement council	8605	3,22	1,09	2,9
26	Solotvynska settlement council	8991	3,36	0,75	4,5
27	Teresvyanska settlement council	7509	2,81	0,59	4,8
28	Bedevlyanska village council	4377	1,64	1,05	1,6
29	Hrushivska village council	5897	2,21	0,97	2,3
30	Nygnyoapshanska village	8564	3,20	1,42	2,2

	council				
31	Rusko-Polivska village council	4364	1,63	1,23	1,3
Khustskyi Region					
32	Khustska city council	28392	10,62	3,16	3,4
33	Vyshkivska settlement council	8284	3,10	5,79	0,5
34	Boronyavska village council	3511	1,31	0,95	1,4
35	Kryvska village council	1365	0,51	0,49	1,0
36	Rokosivska village council	5241	1,96	1,85	1,1
37	Sokyrnycka village council	5217	1,95	1,03	1,9
38	Steblivska village council	2231	0,83	0,93	0,9
39	Velyatynska village council	4576	1,71	2,22	0,8
Rakhivskyi Region					
40	Rakhivska city council	15072	5,64	2,83	2,0
41	Velykobychkivska settlement council	9335	3,49	2,11	1,7
42	Yasinyanska settlement council	8224	3,08	6,96	0,4
43	Bilocerkivska village council	3024	1,13	0,30	3,7
44	Bilynska village council	1746	0,65	1,79	0,4
45	Bohdanska village council	4754	1,78	6,58	0,3
46	Chornotysivska village council	2746	1,03	8,36	0,1
47	Dilovecka village council	3197	1,20	3,54	0,3
48	Kostylivska village council	3002	1,12	2,97	0,4
49	Kvasivska village council	2313	0,86	3,08	0,3
50	Luganska village council	1985	0,74	1,45	0,5
51	Luhivska village council	1008	0,38	8,61	0,0
52	Roztokivska village council	2803	1,05	0,85	1,2
53	Vydrychanska village council	2322	0,87	5,65	0,2
	Total	**267405**	**100.00**	**100.00**	**1,0**

Examples of stakeholders who could be involved in implementing the proposed plan that contains *Objectives, measures and activities*

Objective 1 :

Romania

- Ministry of Environment and Forests
- Regional Infrastructure Development Association in Someş – Tisa River Basin
- Ministry of Agriculture and Rural Development
- ROMSILVA
- Romanian Police
- Maramureş Environment Protection Agency
- Maramureş Emergency Situations Inspectorate
- „Romaninan Waters" National Agency
- Mining operators

Ukraine

- Ministry of Ecology and Natural Resources of Ukraine (Ministry responsible for the environment)
- Ministry of Regional Development, Building and Housing of Ukraine (Ministry responsible for spatial planning, urban development and housing)
- Ministry of Agrarian Policy and Food of Ukraine (Ministry responsible for Agriculture)
- Ministry of Infrastructure of Ukraine (Ministry responsible for transport and tourism)
- State Department of Environmental Protection of Zakarpatska Oblast (Local authority responsible for the environment)
- Main Department of Land Resources Management in Zakarpatska Oblast (Local authority responsible for land resources management)
- Department of Agricultural Development of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the agriculture)
- Operational Administration on Melioration and Water Management of Zakarpatska Oblast (Local authority responsible for the water management)
- Department of Forestry and Hunting of Zakarpatska Oblast (Local authority responsible for the forestry and hunting)
- Department of Housing of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the housing)
- Regional Council of Zakarpatska Oblast
- and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 2 :

Romania

- Ministry of Environment and Forests
- Regional Infrastructure Development Association in Someş – Tisa River Basin
- Ministry of Agriculture and Rural Development
- ROMSILVA
- Environment Protection Agencies
- Emergency Situations Inspectorates
- „Romaninan Waters" National Agency
- Mining operators

Serbia

- Public Water Management Company VODE VOJVODINE

Ukraine

- Ministry of Ecology and Natural Resources of Ukraine (Ministry responsible for the environment)
- State Department of Environmental Protection of Zakarpatska Oblast (Local authority responsible for the environment)
- Operational Administration on Melioration and Water Management of Zakarpatska Oblast (Local authority responsible for the water management)
- Department of Forestry and Hunting of Zakarpatska Oblast (Local authority responsible for the forestry and hunting)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 3 :

Romania

- Ministry of Environment and Forests
- Regional Infrastructure Development Association in Someş – Tisa River Basin
- Ministry of Agriculture and Rural Development
- Environment Protection Agencies
- Emergency Situations Inspectorates
- „Romaninan Waters" National Agency

Serbia

- Public Water Management Company VODE VOJVODINE

Ukraine

- Ministry of Ecology and Natural Resources of Ukraine (Ministry responsible for the environment)
- Ministry of Regional Development, Building and Housing of Ukraine (Ministry responsible for spatial planning, urban development and housing)
- Operational Administration on Melioration and Water Management of Zakarpatska Oblast (Local authority responsible for the water management)
- Department of Regional Development, urbanism and architecture of Zakarpatska Oblast (Local authority responsible for the spatial and urban planning)

Objective 4 :

Romania

- Ministry of Agriculture and Rural Development
- Ministry of Environment and Forests
- ROMSILVA

Ukraine

- Ministry of Ecology and Natural Resources of Ukraine (Ministry responsible for the environment)
- Ministry of Agrarian Policy and Food of Ukraine (Ministry responsible for Agriculture)
- State Department of Environmental Protection of Zakarpatska Oblast (Local authority responsible for the environment)
- Department of Agricultural Development of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the agriculture)
- Department of Forestry and Hunting of Zakarpatska Oblast (Local authority responsible for the forestry and hunting)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 5 :

Romania

- Ministry of Agriculture and Rural Development
- Ministry of Regional Development and Tourism

Serbia

- Provincial Secretariat for Urban Planning, Construction and Environmental Protection

Ukraine

- Ministry of Regional Development, Building and Housing of Ukraine (Ministry responsible for spatial planning, urban development and housing)
- Department of Regional Development, urbanism and architecture of Zakarpatska Oblast (Local authority responsible for the spatial and urban planning)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 6 :

Romania

- Regional Infrastructure Development Association in Someş – Tisa River Basin

Ukraine

- Ministry of Regional Development, Building and Housing of Ukraine (Ministry responsible for spatial planning, urban development and housing)
- Ministry of Emergencies of Ukraine (Ministry responsible for protection of population from emergencies)
- Department of Housing of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the housing)
- Department on emergencies and on population protection from consequences of Chornobyl catastrophe of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for protection of population from emergencies)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 7 :

Ukraine

- Ministry of Regional Development, Building and Housing of Ukraine (Ministry responsible for spatial planning, urban development and housing)
- Ministry of Culture of Ukraine (Ministry responsible for culture including protection of cultural heritage)
- Ministry of Infrastructure of Ukraine (Ministry responsible for tourism)
- Department of Regional Development, urbanism and architecture of Zakarpatska Oblast (Local authority responsible for the spatial and urban planning)
- Main Department on European Integration Issues, Foreign-Economic Relations and Tourism of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the tourism and international relations)
- Department of Culture of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the culture including protection of cultural heritage)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 8 :

Ukraine

- Ministry of Regional Development, Building and Housing of Ukraine (Ministry responsible for spatial planning, urban development and housing)
- Ministry of Infrastructure of Ukraine (Ministry responsible for tourism)
- Department of Regional Development, urbanism and architecture of Zakarpatska Oblast (Local authority responsible for the spatial and urban planning)
- Main Department on European Integration Issues, Foreign-Economic Relations and Tourism of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the tourism and international relations)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 9 :

Ukraine

- Ministry of Infrastructure of Ukraine (Ministry responsible for tourism)
- Main Department on European Integration Issues, Foreign-Economic Relations and Tourism of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the tourism and international relations)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)

Objective 10 :

Ukraine

- Ministry of Infrastructure of Ukraine (Ministry responsible for tourism)
- Main Department on European Integration Issues, Foreign-Economic Relations and Tourism of the Regional State Administration of Zakarpatska Oblast (Local authority responsible for the tourism and international relations)
- Regional Council of Zakarpatska Oblast and the PiP3 area relevant local communes (city, settlement and village councils)