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Transformation processes in the Western Ukraine

Concepts for a sustainable land use

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Preface

The cooperation of German and Ukrainian nature scientists has a long tradition and a changeful history. During the Soviet regime contacts of Ukrainian scientists with research institutes of e.g. Western Europe had been restricted and were strongly controlled. With the political changes, initiated by Gorbatchovs "Perestrojka" also the scientific communication started to increase. On the environmental sector especially the nuclear catastrophe of Chernobyl promoted the need for an exchange of knowledge. As a consequence of radioactive environmental contaminations the Soviet government agreed also to the foundation of non-governmental organisations.

One of the first, that was founded in Ukraine in 1987 was Tovarystvo Lewa. Due to severe pollutions of the Dnister in Western Ukraine caused by emissions of a chemical plant some years ago, Tovarystvo Lewa focused their activities also on the protection of this river ecosystem. To receive international public awareness this NGO organised since 1988 nature conservation expeditions on the river Dnister. One guidance of this expeditions carried out by float was Valentin Stetsyuk.

In 1993, Stephan Niemeier, a German activist of environmental movements and a student of nature conservation at Philipps-Universität Marburg participated in this expedition and met with Valentin Stetsyuk. This meeting was the starting point for a long lasting personal friendship and gave rise to the idea of a German-Ukrainian research-project on the ecology of the river Dnister. Returning back to Marburg with enthusiastic feelings for the unique landscape of the Dnister valley it was easy for Stephan Niemeier to convince his supervisor, Prof. Dr. Harald Plachter, who is always fascinated by the idea to make impossible things possible, of the realisation of a binational nature conservation project. Without doubt, it is the honourable merit of Harald Plachter to give the idea of a German-Ukrainian research-project first scientific contents and above all to open up the necessary financial resources for the realisation of a nature conservation research project in the Western Ukraine. Thus, in 1995 a pilot study, financed by the "Stifterverband für die deutsche Wissenschaft" and supported by the "Ukrainian Ministry of Nature Conservation" started. Due to the successful results of the pilot project, Harald Plachter succeeded to spark the interest of the German Ministry of Education and Research in the German-Ukrainian scientific cooperation.

Starting with April 1997 the German Ministry of Education and Research funded the binational interdisciplinary research-network with three phases (Tab. 1). Thus, the editors and all other coworkers are indebted to the BMBF. Without the financial support, it would not have been possible to realise the project. Special tribute has to be payed to Beate Schütze, Dr. Ingo Fitting, Katharina Sempf and Dr. Joachim Kutscher from the Project Management Organisation Jülich in the Jülich Research Centre for their efforts in realising the research project. The research project was run under the patronage of the UNESCO. We have to express our gratitude to Mr. Vefa Moustafaev and Mr. Mustafa El Tayeb.

Additional support was given by the German Academic Exchange Service (DAAD), which is greatfully acknowledged.

The results of the first two project phases, that were run under the coordination of Philipps-Universität Marburg, documented the unique value of the cultural landscape of the Dnister valley, which is caused by manifold landscape attributes and a high level of biodiversity. On the other hand the transformation processes starting in the 90s have lead to severe alterations of economical condi-

Tab. 1: Phases and targets of the German-Ukrainian BMBF-UNESCO research project "Transformation processes in the Dnister Area (Western Ukraine) – Concepts for sustainable land use

Phase	Duration	Project title
1st phase	April 1997 – August 1998	Ecological analysis and evaluation of the nature conservation value of the Upper Dnister Basin as a model for the development of a river landscape
2nd phase	June 1999 – December 2000	Transformation processes in the Dnister area (Western Ukraine) – (FKZ: 00339699B/6)
3rd phase	October 2001 – December 2005	Transformation processes in the Dnister area (Western Ukraine) – Transfer and implementation of the results into land use planning – (FKZ: 0339699D)

tions and put high pressure on the ecological status of the landscape. Thus, it was a big challenge for a collective of Ukrainian and German scientists to develop in the third project phase, that was coordintated by Technische Universität Dresden, sustainability concepts for selected model regions of the rural landscapes of the Dnister catchment. Besides Dr. Winfried Kuhrt, Berlin (former Senior Legal Secretary, Ministry of the Environment, Lower Saxony), numerous Ukrainian and German scientists from the following institutions contributed to the results of the third project phase, that are published in this book:

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On behalf of the editors
M. Roth

The "Dnister Project" – Targets and Characteristics of the Investigation Area

M. Roth, J. Tsaryk, I. Kruhlov and R. Nobis

As a result of the Earth Summit (UNCED: United Nations Conference on Environment and Development) held in June 1992 in Rio de Janeiro, 170 countries have signed the ***Agenda 21,*** a wide ranging action plan to improve the conditions of the environment and to ensure the sustainable development based on the rational use of natural resources. A basic approach of the Agenda 21 for a development that meets the needs of the present without compromising the ability of future generations to meet their own needs is the integration of environmental aspects in all other fields of politics. Thus, a ***sustainable development*** has to be based on the harmonisation of ecological, economical and social factors of development.

In economically well developed countries the guidelines for the future development which is in accordance with the needs of ***sustainability*** are mostly defined. Partly due to the long lasting and complex processes of restructuring economy and administration transformation countries are still standing at the beginning of the process which results in the implementation of principles of sustainability in the further development of the society.

This applies for ***Ukraine*** too, despite the fact that on the national level several laws and ordinances of the ministerial cabinet and the president concerning the sustainable development have been passed. Their successful implementation on subordinate geographic levels depends to a large part on the regional and local peculiarities of the transformation processes that occur in society, economy and policy as well as on the ac-

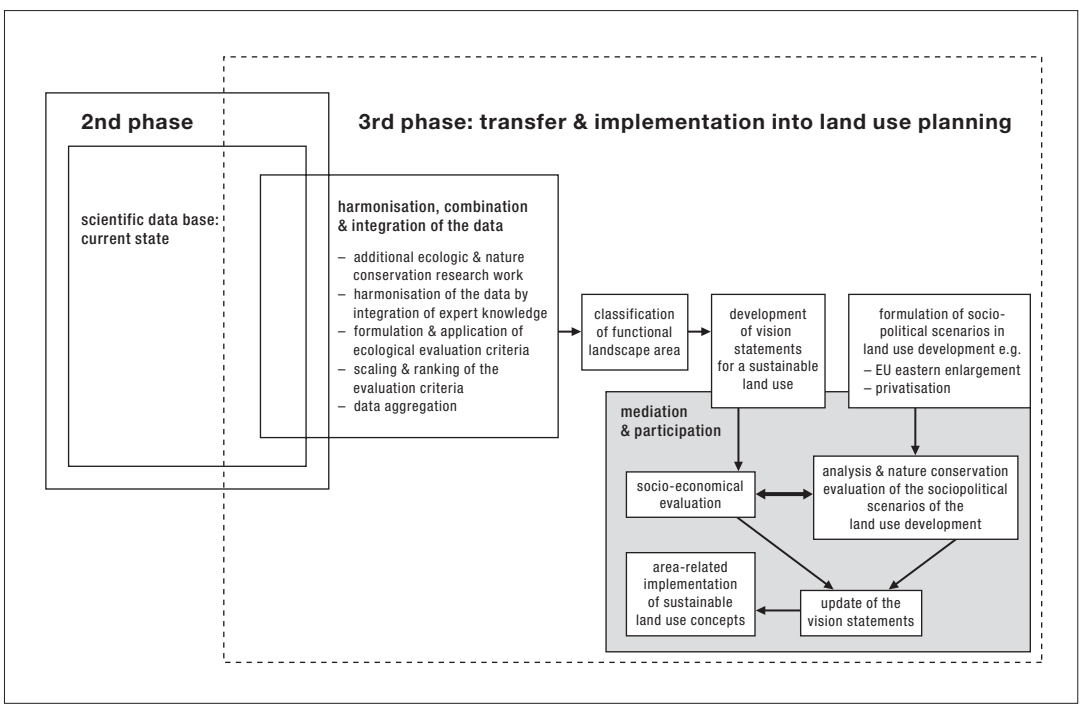

Fig. 1: Working steps of the project

ceptance by local, regional and national decision makers and state-run financial support. Moreover, one of the most important factors that cause the slow pace of the implementation process is the lack of scientifically based concepts for the sustainable use of natural resources which simultaneously ensure the economic wealth of the population. Of special importance in this context are the rural ***cultural landscapes*** of Ukraine that are characterised by agricultural use and forestry and on the other hand a high nature conservation value and that will probably undergo severe alterations due to an increasing influence of a global market economy.

Based on a broad spectrum of scientifically assessed data on natural site conditions (e.g. geology, hydrology, and climate), botanical and fauna biodiversity, land use systems, and socio-demography, the German-Ukrainian research-network aimed at the development of concepts for the sustainable development of rural cultural landscapes in the western part of the transformation country Ukraine. The focus of the research project was laid on the effects of the transformation processes on the sectors agricultural land use, forestry and flood regime including their economic aspects. Starting with the aggregation of the ecological, socio-economic and agricultural data regionally differentiated goals for a ***sustainable land use*** were developed and harmonised with the scenarios for the future development of Ukraine in an iterative process (Fig. 1). The investigations were carried out in close cooperation with Ukrainian decision makers on the local, regional and national level and with corporate organisations of agriculture and forestry to ensure the practical realisation of the concepts of sustainability. For the evaluation and visualisation of the results a GIS based data base adapted to the investigation area was generated.

The investigation area

To develop recommendations for land use systems that correspond with ecological and nature conservation targets and to evaluate their socio-economic effects the ***Upper Dnister Basin*** was selected as model area. With its fluvial topography it is representative for large parts of the Western Ukraine and moreover for other mountainous areas of Central Eastern Europe.

The Upper Dnister Basin is rather conditionally defined by the confluence of the main river (the ***Dnister***) with its small northern tributary, the Koropets. The catchment of the upper Dnister comprises an area of 21,493 km². It constitutes about 30 % of the whole Dnister Basin (Kaganer 1969) and 3.5 % of the territory of Ukraine. The Upper Dnister Basin is almost completely located in Ukraine, except for the small most westward part of 231 km² in the headwaters of the Stryvihor river, which belongs to Poland. The Ukrainian area of the Upper Dnister Basin is assigned to three administrative units: the Oblasts of Lviv (11,017 km²), Ivano-Frankivsk (8,349 km²), and Ternopil (1,896 km²) (Fig. 2).

Fig. 2: Location of the investigation area in the Western Ukraine

Within the Upper Dnister Basin three model regions, representing the classification of natural areas of the western Ukraine were selected (Fig. 3).

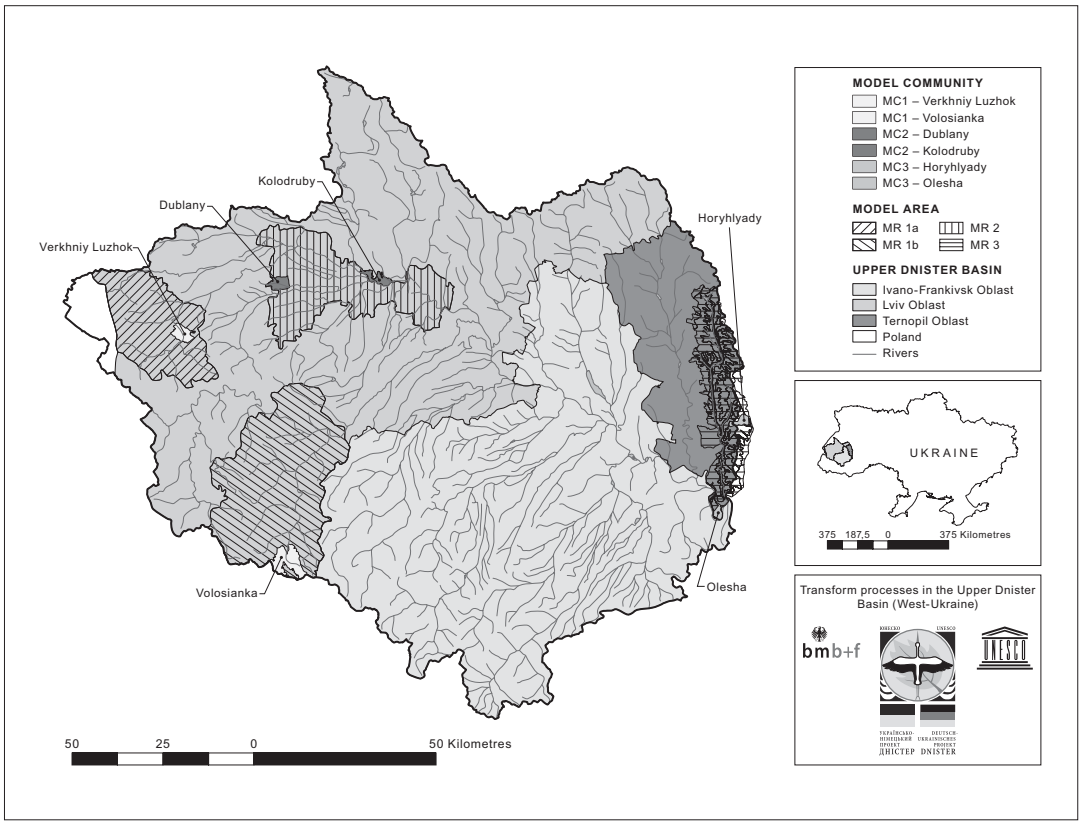

Fig. 3: Location of the model regions and model communities

Model region 1: Carpathians

The Carpathian model region 1 is divided in model region 1a (lower Carpathian highlands) and 1b (Carpathian highlands).

The model region 1a (MR 1a) is located in the Oblast Lviv. As model community representative for the lower parts of the ***Carpathians*** Verkhniy Luzhok was chosen. It consists of two settlements – the villages of ***Verkhniy Luzhok*** and ***Busovysko.*** The community has about 2,210 inhabitants, occupies an area of 2,278 ha and belongs to the Rayon ***Staryi Sambir*** within the Oblast of Lviv. It is located at a distance of about 100 km from Lviv and about 10 km from Staryi Sambir. The community is characterised by a relatively good road and railway connection.

From a natural-geographic point of view, the community is located in the Dnister Beskids low mountain region on both sides of the Dnister river valley. The terrain is characterised by significant elevation spans (368–780 m a.s.l.), steep and very steep slopes dissected by gullies, and moderately cool climate, which caused the formation of brown mountain soils under ***fir***-beech natural forests. Alluvial soils and gravel under willow and alder natural communities occupy the terraced river valley bottom (for more detail see

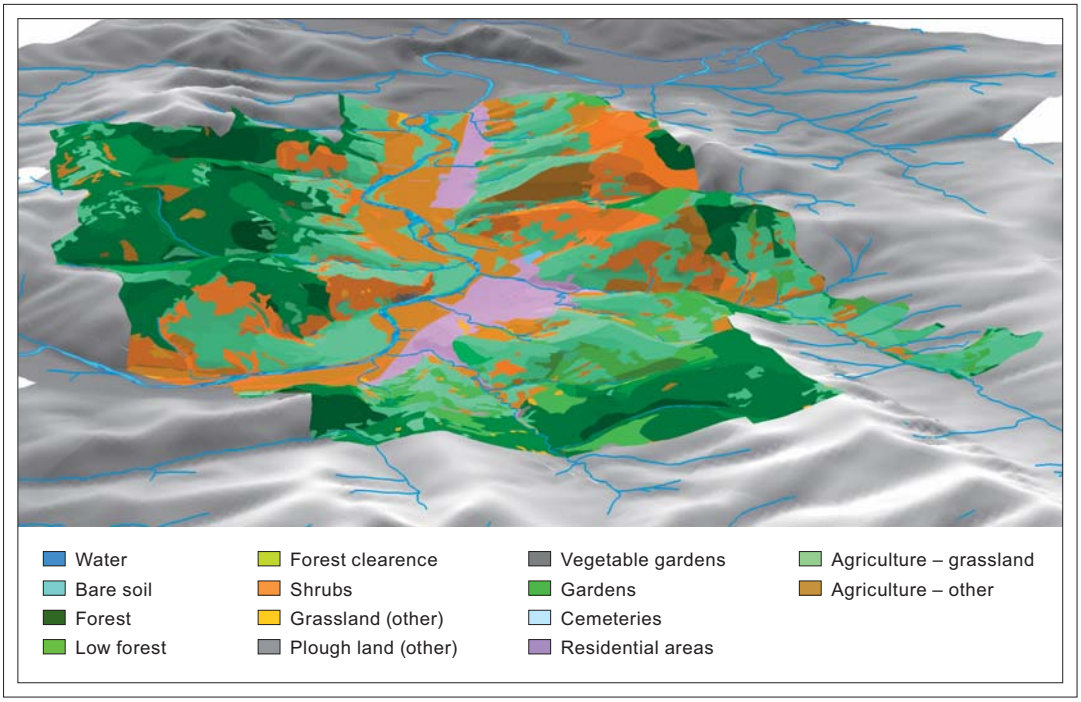

Fig. 4: Map and land coverage of the model community Verkhniy Luzhok

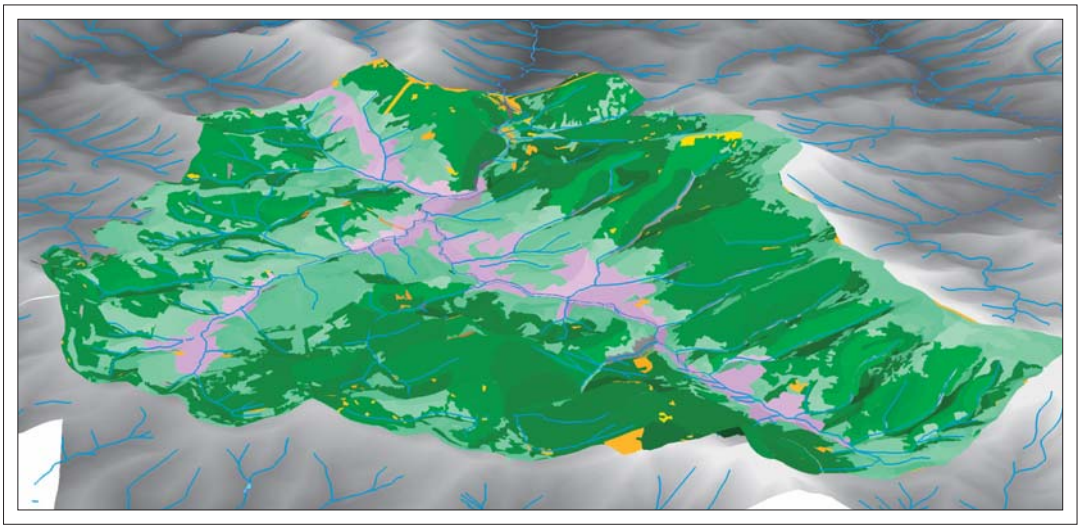

Fig. 5: Map and land coverage of the model community Volosianka (for legend see Fig. 4)

🕮 *Natural Geoecosystems of the Upper Dnister Basin*). The natural landcover has been significantly changed during the centuries of economic activities of the local population. Now the area appears to be a semi-open landscape with patches of ***grassland*** and ***arable land*** in-between the settled and forested sections (Fig. 4; 🕮 *Current Land Use Structure of the Upper Dnister Basin and Recent Changes in the Model Communities*).

The model region 1b (MR 1b) includes the model community of ***Volosianka*** (2,378 inhabitants) which covers an area of 6,825 ha and includes the

larger village of Volosianka as well as the smaller villages of ***Yalynkuvate*** and ***Hashchovanya.*** The community belongs to the Rayon Skole of Lviv Oblast and is located at the very periphery of the administrative units – at the border with Transcarpathians and Ivano-Frankivsk Oblasts. The location is a kind of cul-de-sac formed by mountain ridges with only one bad mud road of about 7 km leading to Slavske – a well-known national mountain ski resort and the nearest railway station. The distance is about 150 km to get from Slavske to Lviv and about 25 km to Skole.

The community of Volosianka is located in the internal ecoregion of the Eastern Carpathians called Verchovyna. These are low and middle flysch mountains with the elevation span of 620–1,250 m within the community territory, steep slopes dissected by gullies, and cool climate which caused the formation of brown mountain soils under spruce-beech natural forests (for more detail see 🕮 *Natural Geoecosystems of the Upper Dnister Basin*). The settlements are located in relatively narrow valleys, and the natural landcover has been significantly changed during the centuries of the economic activities of the local population. On the present day semi-open landscape has patches of grassland and clear-cuts in the matrix of secondary forests with the domination of ***spruce*** (Fig. 5; 🕮 *Current Land Use Structure of the Upper Dnister Basin and Recent Changes in the* ***Model Communities***).

Model region 2: *Precarpathians*

The model region of 584 km² is located in Lviv Oblast and embraces the so-called Upper Dnister Depression. Its western part belongs to Sambir and Drohobych Rayons, while the eastern part is shared by Horodok and Mykolaiv Rayons. There are about 40 villages in the region. Lviv is located to the north-east at a distance of about 40 km, whilst there are several towns to the south-west: Sambir, Drohobych, and Stryi.

The model region occupies the wide (up to 8 km) Dnister valley filled with peat and alluvial deposits as well as wavy uplands with gentle slopes and loess cover forming the southern limit of the valley. The uplands are separated by relatively wide (1.5–3 km) secondary river valleys. The elevation span is 240–370 m a.s.l. The natural vegetation is represented by alder forests and wet meadows in the valley bottoms, and by oak-hornbeam forests on the uplands (for more detail see 🕮 *Natural Geoecosystems of the Upper Dnister Basin*). Today, this is primarily an agricultural region occupied by grassland and arable land.

There are two model communities chosen in the model region: The community of ***Kolodruby*** is located at the eastern part of the wide Dnister valley and belongs to Mykolaiv Rayon. It has 1,077 inhabitants and covers an area of 1,736 ha. The distance to Mykolaiv is about 15 km, while to Lviv – about 55 km. The area is rather flat – the elevation span is 250–270 m a.s.l. The soils vary from peat and alluvial silt in depressions to podzolised loamy sand on more elevated parts. The natural vegetation was dominated by ***oak*** and alder forests. Today, forests occupy only a small portion of the community land, giving way to grassland and arable land (Fig. 6).

The community of ***Dubliany*** has an area of 2,560 ha and a population of 2,300 inhabitants. It is located at the southwestern limit of the model region on the elevated Dnister-Bystrytsia Pidbuzhanska ***interfluve.*** The community belongs to Sambir Rayon. The distance to Sambir is about 15 km, while to Lviv – about 60 km. The southern part of the community territory is situated in the flat bottom of the Bystrytsia Pidbuzhanska valley filled with alluvial silt and peat. The larger northern part is on the ***interfluve*** and is composed of loess-like loam with podzolised sod soil. The elevation span is 270–315 m a.s.l. The natural vegetation of the ***interfluve*** is oak-***hornbeam*** forest, with oak and alder forests in the valley bottom. Now arable land and grassland replace them (Fig. 7).

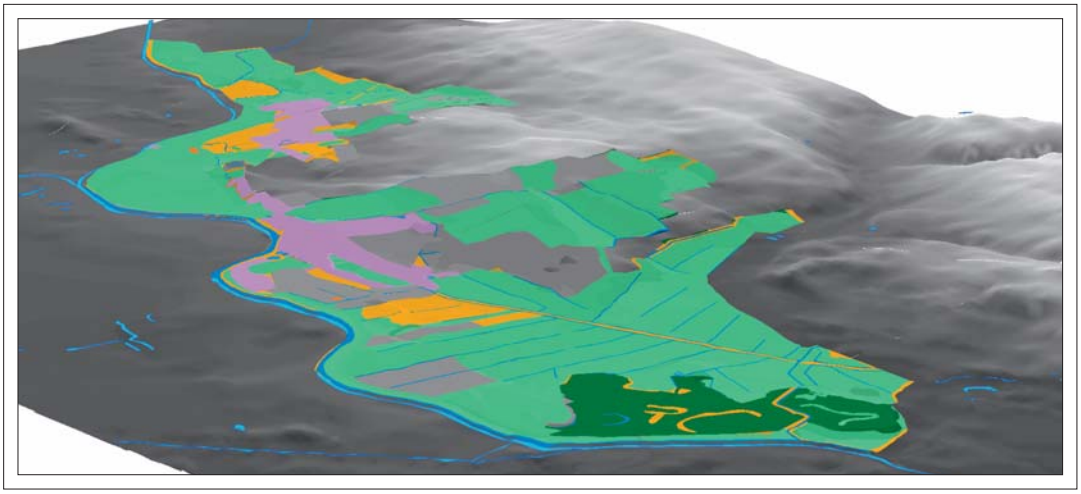

Fig. 6: Map and land coverage of the model community Kolodruby (for legend see Fig. 4)

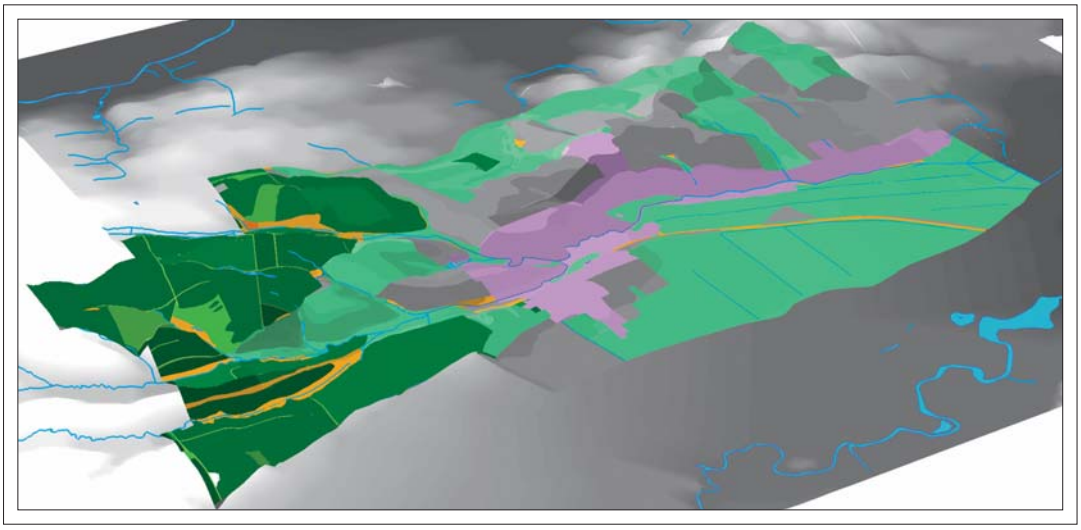

Fig. 7: Map and land coverage of the model community Dubliany (for legend see Fig. 4)

Model region 3: *Podolian Plate*

This area has 412 km² and is located at the eastern-most part of the Upper Dnister Basin. It embraces parts of Pidhaytsi and Monastyryska Rayons of Ternopil Oblast. The towns of Monastyryska and Pidhaytsi are located within the area. The distance to Ternopil from the middle of the area is about 70–80 km. From the physical-geographic point of view, the area is located within the ***Koropets*** river basin at the eastern termination of the High Opillia ecoregion. The Koropets and the Dnister are deeply cut into a rolling watershed surface creating canyon-like valleys with steep slopes. The elevation span is 195–405 m a.s.l., and the canyon walls can have relative altitudes of over 200 m. The watershed surfaces have gentle to moderate slopes; they are covered with loess-like loam and occupied by chernozemic podzolised soils. Once they were covered with oak-hornbeam forests, but

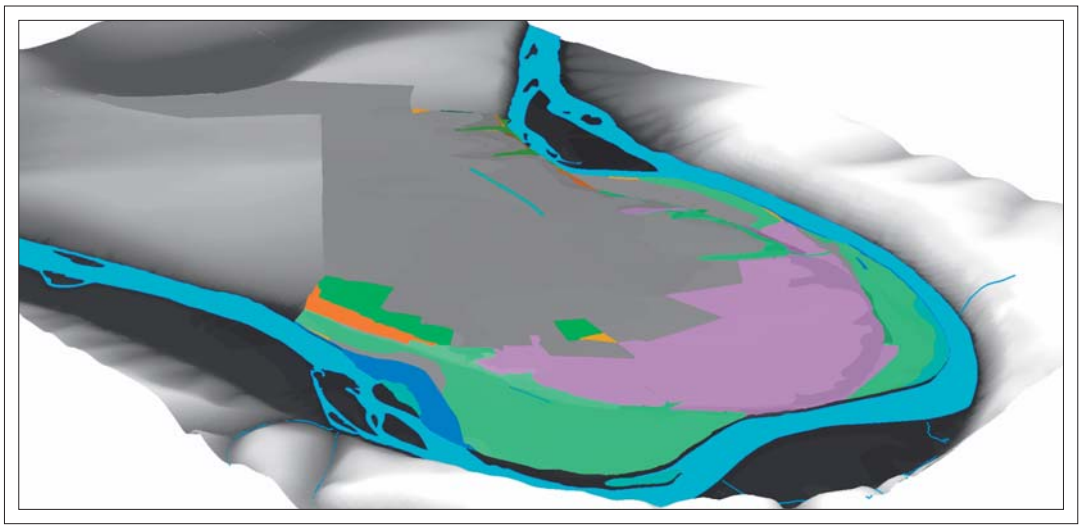

Fig. 8: Map and land coverage of the model community Horyhliady (for legend see Fig. 4)

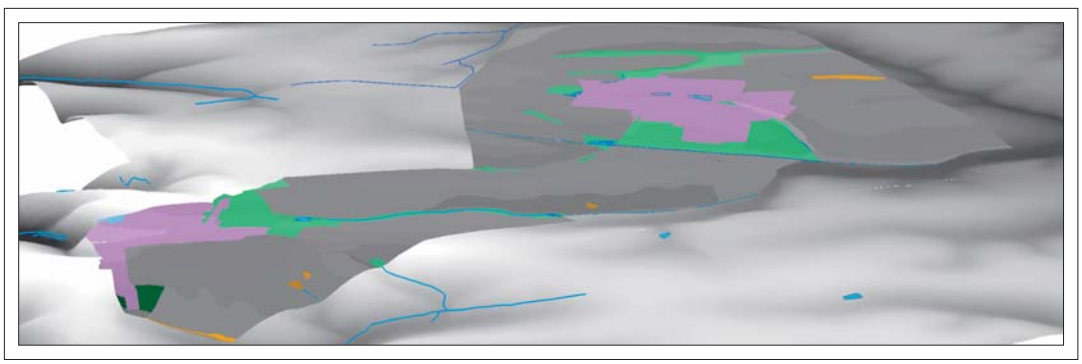

Fig. 9: Map and land coverage of the model community Olesha (for legend see Fig. 4)

now they are used as arable land. The steep slopes of the valleys with calcareous rock outcrops are covered with beech-hornbeam forests (for more detail see 🕮 *Natural Geoecosystems of the Upper Dnister Basin*).

Two model communities which are characteristic for the region were chosen. The community of ***Horyhliady*** is located at the south in the canyon-like Dnister valley at the confluence with the Koropets. It has an area of 847 ha, and a population size of 1,253 inhabitants. The community belongs to Monastyryska Rayon. The distance to Monastyryska is about 30 km, while to Ternopil – about 110 km. The community occupies gently and moderately sloping low and middle terraces with the elevations of 190–260 m a.s.l. The terraces are covered with loess-like loam that serves as a parent rock to chernozemic soils. Once the region was covered with oak forests, but now the forests are replaced by arable land (Fig. 8).

The community of ***Olesha*** (1,150 ha; 641 inhabitants) is situated at the eastern border of the model region. It also belongs to Monastyryska Rayon. The distance to the rayon centre is about 10 km. The village occupies the rolling watershed surface formed by loess-like loam. The elevations are between 350–390 m a.s.l. The oak-hornbeam forests that once covered fertile chernozemic soil were cut long ago and replaced by arable land. Forested patches are preserved only on the steep slopes of the valleys which are not suitable for ploughing (Fig. 9).