

Classification and evaluation of town Nitra's contact area

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Abstract: Nitra town development tendency is tented on its hinterland at present. The research area consists of two parts. The first is the settlement part formed by city parts Zobor, Chrenová, Klokočina, Diely, Čermáň and Staré Mesto and hinterland part with villages neighbouring with town Nitra. The contact area is determined as 600 meters wide strip extending along the borderline between settlement part and its enclosed hinterland. Structure of this contact area is evaluated in two time horizons (1995 and 2010). In 2010 in the secondary landscape structure of contact area are occurrences these groups of elements: forest (16,2 %), arable crops (41,6 %), meadows and pastures (4,8 %), sub soils and raw soils (0,7 %), waters elements (1,8 %), elements of seats and recreation areas (24 %), technical elements (8,7 %), elements of transport (2,2 %). In 1995 in the secondary landscape structure of contact area are occurrences these groups of elements: forest (16 %), arable crops (47,8 %), meadows and pastures (5,9 %), sub soils and raw soils (0,8 %), waters elements (1,9 %), elements of seats and recreation areas (17,7 %), technical elements (7,5 %), elements of transport (2,4 %). Landscape structure and selected criteria are the bases for contact area classification. We distinguish 4 types of contact area: submontane forest (type A), plane field (type B), upland with arable crops (type C) and waved plain with settlement (type D). In the process of evaluation of contact area were determinate four functions (technically producing, suburban agricultural production, recreational and residential), by method of synthesis were determined three zones (technically producing, suburban agricultural production and recreational) and two potential usages (recreation and agricultural usage).

Key words: landscape classification, contact area of town, secondary landscape structure

Introduction

Suburban landscape or temporary contact area creates direct town environment and it is considered to be the most varied and ecologically least explored area. Marginal zone is very specific. Its character depends on the residence utility and the possibility of its loading by different activities, e.g. recreational one. They can be also indicated as "open space" since they create suitable conditions for such the activities. As it is mentioned by many authors (Marenčák, Supuka, Jančura, Kollár, 1996; Jančura, Supuka, Marenčák, 1997), landscape transformation and its principles must arise from landscape ecology.

Contact area is closely connected with residential environment. It is considered to be the area with the most significant demonstration of the present urbanization process and its consequences. It is not possible to characterize contact area as temporary landscape type in case we do not know its residential structure.

Nitra is the town with dynamic development oriented to the provision of habitation, services and job opportunities. Such the developmental activities are being realized inside the settlement within the open spaces or they pressurize the outside part of the town, the contact environment and its territory.

Material and methods

Nitra town and its contact environment with the area of 3 201, 05 ha is being considered to be the interest territory. The whole cadastral area of Nitra consists of 13 town sections with the area of 10 979 ha and 87 533 inhabitants. The present Nitra is the administration centre of Nitra Self-Governing Region, centre of economy, culture, church and sport as well as the international exhibition centre because of Agrokomplex, the convener of fairs and tradeshows.

Nitra is placed in the area surrounded by Zobor massif (587 m AMSL), Calvary hills (215 m AMSL) and Šibeničný vrch (218 m AMSL) that are considered to be the part of Tribeč Mountain. It is stretched in the edge of two natural complexes – lowland landscape of Panónska panva and basin area of Carpathian Mountains (Gajdoš et al., 1990).

Contact area of Nitra town is being determined in two directions – from the settlement by the borders of town sections (Staré Mesto, Kalvária, Chrenová, Zobor, Čermáň, Klokočina and Diely) and from the surrounding country in which the contact area is bounded by the lands of agricultural and forest soil fund. Contact territory with the area of 1500, 54 ha has the shape of 600 m wide stripe extended along the external borders of town sections belonging into the residential part of the interest area.

Structure of contact area is evaluated in two time horizons (1995 and 2010). The analysis of town landscape structure and its elements was realized by the field survey in 2005 and updated in 2010 by LANDEP method evaluating elements of secondary landscape structure. Landscape structure in 1995 was determined by maps and others historical sources. The analysis has confirmed individuality of the interest area and its background that was supported by the fact that following factors participate in and deal with its character. These factors can be also used as the criteria necessary for the allocation of the contact areas and their types:

- course of the controlled Nitra river basin, the influence of which works as the natural barrier of settlement development and extension into the surrounding agricultural landscape;
- type of relief in the interest area (lowlands and undulating lowlands, highlands and uplands);
- occurrence of the past satellite settlements of the provincial type.

According to the mentioned factors, criteria of types of contact areas and their determination can be divided into two groups indicating four types of contact areas in the interest territory. Borders of the regions detached within the residential structure or borders of the town sections belonging into the relevant contact area have been respected in the process of contact areas and their type determination. Such the way of borders and their type determination has been used in case of its detachment out of the natural borders or regional borders by the chosen criterion.

Results

In 1995 structure of the contact area is being characterized by the occurrence of the following elements groups (tab. 1): arable crops (47,8%), elements of seats and recreation areas (17,7%), forest (16%), technical elements (7,5 %), meadows and pastures (5,9%), transport elements (2,4 %), waters elements (1,9%) and sub soils and raw soils (0,8%).

In 2010 structure of the contact area is being characterized by the occurrence of the following elements and their groups (tab. 1): groups of elements of arable crops belong into the largest groups (41,6%), elements of seats and recreation areas (24 %), forest elements (16,2%). Other groups of elements participate in the structure of the contact area by the representation lower than 10%.

In the comparison of elements groups area occurrence in 1995 - 2010 (tab.1) is evident the largest decrease of group of arable crops (- 92,12 ha). The decrease was registered in the landscape element large areal fields because of buildings of the individual housing in city part Zobor, Klokočina, Chrenová and Čermáň and buildings of technical objects. In the spring of 2010 started the construction of the highway in city part Čermáň (fig. 1a) and Janíkovce (fig. 1b). The group of meadow and pastures elements belongs into the groups with decrease of area (- 15,72 ha), the same as group of transport elements (- 3,46 ha). Minimum of area decrease was registered in the groups of sub soils and raw soils and water elements. Only three groups of elements increased their areas; they are elements of seats and recreation areas (97,81 ha), technical elements (21,24 ha) and forest elements

(4,23 ha). The elements of these groups increase their areas detriment of two groups – meadows and pastures and almost arable crops elements.

Four types of contact areas have been determined by the chosen criteria and analysis of functional elements of secondary landscape structure (fig. 2):

Submontane forest contact area (type A) is being individually represented in the north part of the structure of interest territory. It is placed in the headland of Zobor hill in the highland relief. It is separated from the other parts of the interest area by Nitra riverbed. Two functional elements prevail in the mentioned type: deciduous forest and individual housing construction with economic gardens. The total area of this type in the contact area is 365, 99 ha (24%);

Plane field contact area (type B) is being found in three parts – north-west, south-east and east. Plane relief with the surface predominance of large block fields has been indicated as the common feature for its determination. The total area of this type is 521,37 ha. It belongs into the group of surface prevailing contact area with the share of 35%;

Highland contact area with permanent cultures (type C) is being characterized by gradual transfer of relief from the undulated plain into the highland. Forests and vineyards or vineyards with orchards prevail as the functional elements. This type is being placed in the south-west and north-east part of the contact area with the total area of 310,17 ha (21%);

Undulated plain settled contact area (type D) is being specified by its connection with the past satellite settlements – today's town sections that belong to the urban settlement of the town. These are e.g. Horné Krškany, Janíkovce and Mlynárce.



Fig. 1 Construction of the highway in Čermáň (a) and Janíkovce (b) – the catch of arable soil (Mišovičová, 2010)

Table 1. Area of landscape elements in contact area of town Nitra in 1995 and 2010 (Mišovičová, in print)

Groups of landscape elements		1995		2010		Difference
		Area (ha)	%	Area (ha)	%	
1	forests	240,62	16,0	244,85	16,2	4,23
2	meadows and pastures	87,8	5,9	72,08	4,8	- 15,72
3	arable crops	716,86	47,8	624,74	41,6	- 92,12
4	water elements	27,88	1,9	26,36	1,8	- 1,52
5	sub soils and raw soils	12,17	0,8	10,71	0,7	- 1,46
6	elements of seats and recreation areas	265,34	17,7	363,15	24,0	97,81
7	technical	112,94	7,5	134,18	8,7	21,24
8	transport	36,93	2,4	33,47	2,2	- 3,46
Summary		1500,54	100	1500,54	100	0,00

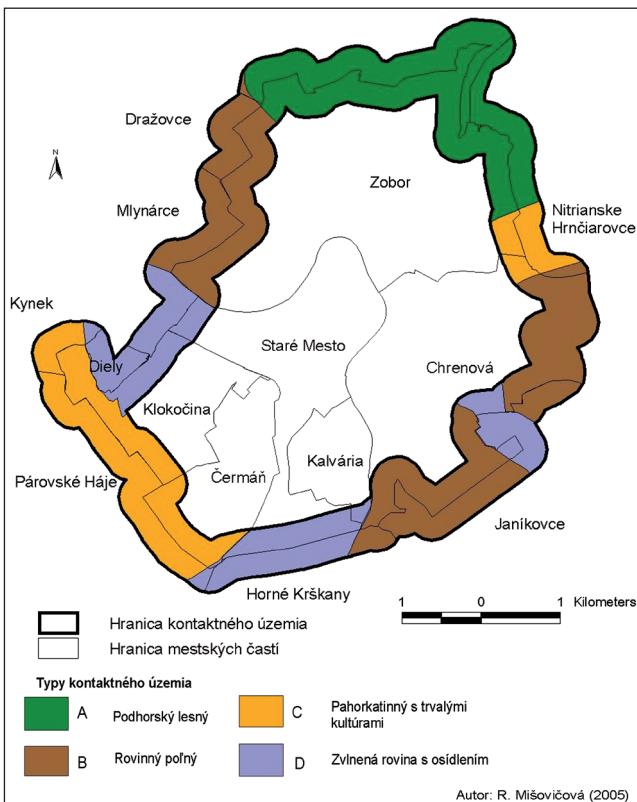


Fig. 2. Contact area classification of town Nitra (Mišovičová, in print)

its structure. Determination of functional elements according to the groups they were involved in within the evaluation of its structure was considered to be the satisfactory one. Occurrence and surface representation of functional elements enable to fulfil following functions of the contact area of Nitra town:

- technically producing function that is being arranged by the functional elements from the group of elements connected with technical products and traffic, e.g. stores, entrepreneurial entities, barracks, etc. Contact area fulfils mentioned function in the south part of Horné Krškany town section, east part of Chrenová and west part in the border line of Mlynárce and Horné Mesto town section. These parts of the town are considered to be the industrial one belonging to the production area with the prevailing surface representation of industrial complexes.
- suburban agricultural production with dominant position. Large block fields (group of arable crops) border contact area from the outer part (in the direction out of the surrounding landscape). Functional elements of farm and service yard fulfil such the function within the group of technical products.
- recreational function that is being located in its two parts. The north part is covered by deciduous forest that belongs into the protected landscape area of Ponitrie (group of forest vegetation elements) and the south-east part is the area of Agrokomplex exhibition ground placement (group of elements in residential and recreational areas).
- residential function in the form of individual or collective living. Accommodation objects are being connected with the large block fields as well as with deciduous forest in the north part. Collective living does not have the tendency to spread its surface share. On the contrary, individual living disposes of growing tendency and it raises its surface share by the scope of large block fields and transformation of vineyards and gardens into the individual living, e.g. Šúdol – town section Klokočina, Viničky – town section Diely, town section Zobor and Chrenová.

In case we know prevailing function or typological arrangement of the surrounding landscape as well as function of the contact area elements, we can classify its elements into the zones fulfilling urban function of

The mentioned town sections also determine character of the contact areas. Large block fields and service yards can be found in the contact area that is being connected with Janíkovce in its east part with the dominance of the individual housing construction and the recreational areas. The west contact area is being connected with town section of Mlynárce with the prevailing functional elements of vineyards, gardens and large block fields the area of which is falling by the constructions and buildings of the individual housing construction and the entrepreneurial entities. Contact area connected with the south part of Horné Krškany has the character of industrial complex surrounded by fields and the individual housing construction. The total area of this type is 303, 01 ha (20%).

Method of element evaluation creating its structure has been used within the evaluation of the contact area. Choice of the evaluation criteria represents very important step in the process of assessment. It was the function of contact area according to the functional elements representation in its structure.

the neighbouring country. They are being characterized by the prevalence of the elements with the relevant additional function of the surroundings, i.e. they can fulfil the primary as well as the additional function and in that way compensate influences of the human activities into the neighbouring landscape (Gažová, 1984).

Interest area is surrounded by two basic landscape types – forest (in the north part) and agricultural bordering the rest of the larger area. The presence and the connection of town sections with the past satellite village residences (Mlynárce, Horné Krškany, Janíkovce) have been registered as the next criteria of zone and landscape type determination. Zones of contact areas of Nitra town are being formed by the functional elements creating its structure. The concrete functional utilization has been allocated to them. Following zone types have been detached in the contact area of Nitra town:

a) technically economic zone – it has been determined on the basis of the combination of two criteria: prevalence of technical elements in the contact area and the past satellite village residences as the surrounding type of landscape. Such the criteria fulfil conditions of two parts of contact area. Staré Mesto town section is being connected with Horné Krškany town section in the south part with the industrial build-up area, services and living as the additional function. Staré Mesto town section in the west part is being connected with the town section of Mlynárce with the characteristic prevalence of technical elements with the additional living function;

b) suburban agricultural production that is also connected with the surrounding agricultural landscape with the largest area. Individual as well as collective living and services are being considered to be the additional functions;

c) recreational one, surrounded by forest landscape in the north part of the contact area (town section Zobor). Vineyards and gardens involved in the objects of recreation have been also involved in the group of functional elements.

Function and potential determined by the combination of utility attributes of the surrounding landscape and character of the contact area structure have been assessed within the evaluation of the contact area. Potential has been compared with developmental activities of Nitra town authorized by the City plan (Kolektív, 2003). Potential for recreation and agricultural activity has been determined in the town contact area. Developmental activities are planned in two phases. The first phase of development is planned till 2020. The second one, so called after-proposal phase involves formation of territorial reserves needed for demographic increase of the settlement. Plans of soil sources utilization are divided in two parts according to their placement in the built and un-built areas. Determined contact area interferes built and un-built parts of the urban settlement.

Four localities have recreational potential. The largest one is the north part of Zobor town section. This potential will not be used and accepted in accordance with the plans of town development because of the planned building process. Family houses and civic amenities development will be realized to the prejudice of vineyards and plough lands. South-east part placed behind Agrokomplex exhibition ground with DD ranch and riding hall is the next area with recreational potential. This part will be developed and used as the recreational one because of its planned supporting. Deciduous forest Čermáň with the potential recreational utilization is placed behind Čermáň town section, on the border of the contact area. Family houses construction is planned to be realized in this area. It means that the request of the suburban forest planting for the needs of the short-time recreation seems to be correct and legitimate. The next recreational area of the whole town meaning would be formed. The situation is very similar in case of deciduous forest Hrabina in Šúdolská dolina (valley) behind Klokočina town section. Housing construction is being planned here. Watercourse of Nitra River and its surroundings can be considered to be the area with recreational potential in the west part of the contact area. This part of the contact area plans housing construction in the localities of Horné and Párovské lúky behind Nitra River, in Mlynárce town section. Riverbed and riverside vegetation would separate zone of living and zone of industry that is centred into this part of contact area.

Potential for agriculture has been determined in the other parts of the contact area on the basis of the chosen criteria. Comparison of town developmental activities has found that contact area will not be agriculturally utilized because of the confirmed and approved occupation of land resources, e. g. in city part Čermáň where is constructs the highway by the catch of arable soil (fig. 1a). Construction and development of family houses, amenities and production objects is also being planned (town cemetery extension).

Conclusion

Present development of Nitra town is oriented to the activities satisfying basic needs of inhabitants. It uses open spaces inside the settlement or spaces of wider background for its developmental activities. Construction inside the settlement is being realized by the occupation of free unused areas, reconstruction of already existing old areas or public areas of vegetation. Since there is not enough space inside the settlement, construction is being realized in the town up-country within the soil fund. We expect decrease of soils with lower production function in the whole cadastral area of the town (1810 ha; 16,8%) (Kolektív, 2003) as well as in all soils of different qualities. From the ecological perspective it is necessary to keep developmental activities in accordance with functional and potential utilization of contact area and to prevent uncoordinated conflict of different activities within the contact place of the settlement with free landscape the result of which would be their devastation and inappropriate way of their utilization. Contact area acquires character of barrier between the settlement and surrounding landscape (Gážová, 1984). It is necessary to know and to evaluate landscape structure of the settlement forming the basic analytical foundation for landscape evaluation.

Many authors deal with the problems of landscape structure and its evaluation in accordance with the secondary landscape structure, e.g. Pucherová (2004) whose work is evaluating changes of secondary landscape structure in the selected villages of Predzoborie in different time phases; Bugár (Halada, Bugár, 2006) who is evaluating landscape structure in the form of land cover; Petrovič (2005) who deals with the settlement; Boltižiar (2007) dealing with evaluation of alpine landscape structure and Hreško (Hreško, Kanásová, Petrovič, 2010) who is oriented to the historical landscape structures. Petluš, Vanková (2009) deal with the structure and visual evaluation of agricultural landscape.

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