

## AGROSTRUCTURES OF BRATISLAVA

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**Abstract:** The agrostructures formation has its own rules derived from natural and social-economic conditions of the territory. They are formed in specific way in urban and sub-urban spaces. The ideas of J. von Thünen, founder of market urban and urban hinterland agrostructures, are stimulating also in present geography. In this paper, we deal with agrostructures within cadastral territory of Bratislava. We focus on eventual links to Thünen's theory of market centre, and its relation to the nearest agricultural hinterland. There has developed specific feature of Bratislava's agrostructures. Regular concentric circles, which would document different specialisation of agrostructures, did not occur. It is caused mainly due to the Malé Karpaty mountain barrier, eccentric position towards territory of the state (being in fact border region), the river Danube, as well as because of different agro-ecological conditions of related Záhorská and Podunajská lowlands.

**Key words:** agrostructures, urban hinterland, intensive gardening, fruits growing, mixed agriculture type

### 1. INTRODUCTION

The formation of agrostructures follows its own principles, which are derived from natural and socio-economical conditions of territory. In a specific way are formed agrostructures in urban and urban hinterland areas. Ideas of J. von Thünen, the founder of market urban and urban hinterland agrostructures remain inspiring also in present geography.

This contribution deals with agrostructures within Bratislava's territory, paying attention to possible ties with Thünen's theory of market centre formation in relation to a nearest agricultural hinterland.

## 2. THEORETICAL-METHODOLOGICAL ASPECTS OF AGROSTRUCTURES IN A CITY

Agriculture in urban hinterland partly differs from urban agriculture. It is especially its significant specialisation and its gradual expansion to peripheral areas of the city. Despite these tendencies, this kind of agriculture preserves some attributes of Thünen's model of market city.

Although conditions for agriculture have changed and further development overcome isolation of markets, Thünen's theory still stays a basic starting point in analysis of spatial organisation and model of economic relations in an area of a large city, as well as its closer and more remote hinterland. However, analysis of this theory clearly documents that generally accepted localisation of agriculture does not exist in current times. It does exist only certain rational directions that are valid under particular circumstances. Thünen's theory of market agriculture centre is based on following conditions (Ivanička 1971, Häufler 1964):

1. Existence of isolated space, in which the whole agriculture hinterland gravitate to one market,
2. A city is a market for a surplus production from hinterland and other products from different area are not delivered,
3. A hinterland does not sell products at another market as in a city, to which it gravitate
4. Farmers in the hinterland area are interested in profit maximisation,
5. Agricultural enterprises are connected with a city only by one traffic mean, with the equal transport costs,
6. Transport costs depend directly on traffic distance,
7. Agricultural products are transported fresh, in non-processed state,
8. Agricultural area is homogeneous as for its natural conditions.

If these conditions remain stable, then different agricultural specialised zones develop, because specialisation of each of them determines a product price on market, their production costs.

Growing distance to the market and related rising transport costs cause decrease of profit. Theoretically as well as practically, there exists boundary in some distance. From territory behind this boundary, it is not reasonable to send products to the market, because transport and production costs exceed its market price. This boundary varies for different products. It is closer for milk, fastened vegetables, eggs, flowers, more distant for wheat, pork, and the most distant for cattle and sheep.

It is often necessary to determine an internal boundary of urban hinterland agrozone. Mentioned boundary is frequently set by external circle of city cadastral area, while external boundary is determined according to total size of a city and according to the following factors:

- ♦ reserves for city's spatial expansion,

- ◆ industrial areas,
- ◆ agricultural land that serves for vegetable and fruit production, for milk production, nurseries, and other agricultural production serving for a city,
- ◆ health institutions, municipal enterprises areas, water protecting areas, water cleaning stations, waste disposals and waste liquidation facilities,
- ◆ external and urban transport facilities,
- ◆ memorial places and archaeological sites related to city,
- ◆ raw material base for construction industry,
- ◆ areas of recreation and housing estates, forest parks, sport and tourism facilities.

Agricultural enterprises working on agricultural land are part of agrozones in city hinterland. These agricultural enterprises constitute urban hinterland agriculture. Products of this agriculture can be divided into the three groups:

- a) products, non-suitable for longer transport. It means that they have big losses and can be biologically devalued, e.g. some kind of fruits (cherries, strawberries, currants, raspberries, gooseberries etc.), milk, vegetable (fasted, lettuce, spinach), fresh eggs.
- b) products, where transport for long distances is not efficient (big volume, big content of water), e.g. water melons, cucumbers, potatoes (especially spring). It is possible to tell about non-economical transport only when there is possibility to grow some plants directly in a zone near to city.
- c) animal products (eggs, poultry, pork), which are the most demanded on the market and it is possible to utilise city waste in their production.

For agriculture in urban hinterland, it is not typical only production for a city. It is necessary to emphasise that on the other hand, agriculture in urban hinterland gains energy, or waste from city and participate in economic life of city.

Whether agricultural enterprise is part of urban hinterland agriculture, it is determined by three characteristics:

1. direct economic (production) connection of subjects spread within a city with city or industrial centre,
2. organisational, living and cultural connection of citizens working in subjects connected with city or industrial centre,
3. transport connection of production area with consumption area, especially with city or industrial centre.

Some authors include into urban hinterland agriculture the whole regions, in attempt to simplify getting of needed data. Needed amount of regions depends on size of consumption centre, as well as natural and socio-economic conditions for agriculture. Eventually also depends on relations of this centre with traditional agricultural production regions. It is a question, if all enterprises of region or just selected ones belong to urban hinterland agriculture. There is not clear answer to this question. It would not be good to establish special milk farm bases from single agricultural enterprises (except special stables for healthy non-defective milk production) in our

conditions, in which high percentage of cows and their increased utilisation would be advertised. In this case, it would be much better to increase percentage of cows and their milk yield in all agricultural enterprises of one or several regions close to a city. I similar way, it would not be purposeful, if all of agricultural enterprises grow vegetable (including fastened vegetables), because there can be more or less suitable natural and socio-economical conditions in region. Generally pays, that none of urban hinterland agriculture is bound only to own city regions (if a city is divided in such way), or regions neighbouring to the city as the case may be (Figure 1). The most advanced are such agricultural enterprises, which are the most adaptable according to their location and production assortment on the market conditions.

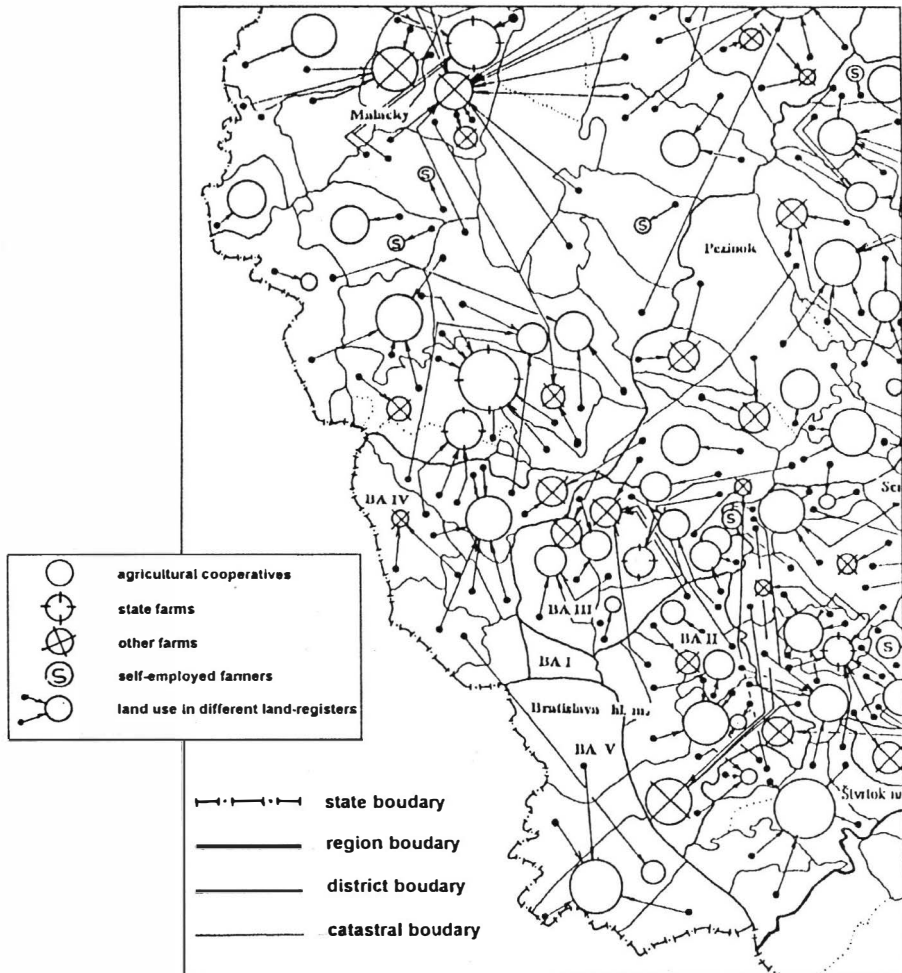


Fig. 1 Agricultural land distribution of the area of Bratislava

### 3. AGROSTRUCTURES OF BRATISLAVA

Typical for Bratislava as a market city is, that from the territorial-administrative point of view, Bratislava is divided into 5 regions, where except region Bratislava I, all of them have quite good natural as well as social and economic conditions for well-developed urban hinterland agriculture. As for natural conditions, there are especially quality lands (Podunajská nížina), sufficient amount of warmth, as well as water sources (either ground or underground waters). To estimate special market zones for Bratislava according to Thünen, here does not work only one market, only one market zone. Here exists variability of transport means, freezing and air-conditioning facilities have been established. There is a competition with industry, services in attracting work force, with relatively the lowest interest to work in agriculture. Research in land use of Bratislava and its hinterland shows, that vegetable and fruit growing cover smaller areas in Bratislava, as in villages situated further from a main centre of consumption of these products.

It is possible to see basic elements of urban hinterland agriculture in Bratislava, however it is combined also with some agricultural activities of more than regional significance, like specialised vineyards. From the whole area of a city (36,7 thousand ha), there is 14,9 thousand ha of agricultural land (40,5 %). In general, we can observe decrease in agricultural land in Bratislava. It concerns approximately 240 ha since 1990. The biggest was decrease in orchards and vineyards' areas. Despite this decrease, such size of agricultural land has only a few capitals in Central Europe. Arable land composes 11,2 thousand ha of agriculture land, followed by gardens, orchards. Important position have vineyards with size of 865 ha (see Figure 2).

As far as the production structure is concerned, there are 9 agricultural enterprises active on the territory of Bratislava. Except Staré Mesto, enterprises are in each of city parts. The most of them is situated in the eastern part of the city, where Podunajská nížina reaches. They are especially agricultural co-operatives (PD): PD Rusovce, PD Podunajské Biskupice, PD Ružinov, PD Trnávka, PD Vajnory, Unigalex (joint stock company). In the western part of the city, where Záhorská nížina reaches, it is PD Záhorská Bystrica, and on the slopes of the Malé Karpaty is PD Rača and PD Vinohrady. Agrostructures of the city are completed by some specialised service elements, mainly research institutions with more than regional character, e.g. complex vineyard and vine institution, central control and exam agricultural institution, research institution of agricultural economics and food processing.

If we want to adapt Thünen's model of market agrocentre for Bratislava, there are some specific features. There were not created regular circles, which would document different specialisation of agrostructures, especially thanks to mountain barrier of the Malé Karpaty, an eccentric location in the state (boundary area), river the Danube, as well as different agro-ecological conditions of near lowlands - Záhorská a Podunajská nížina.

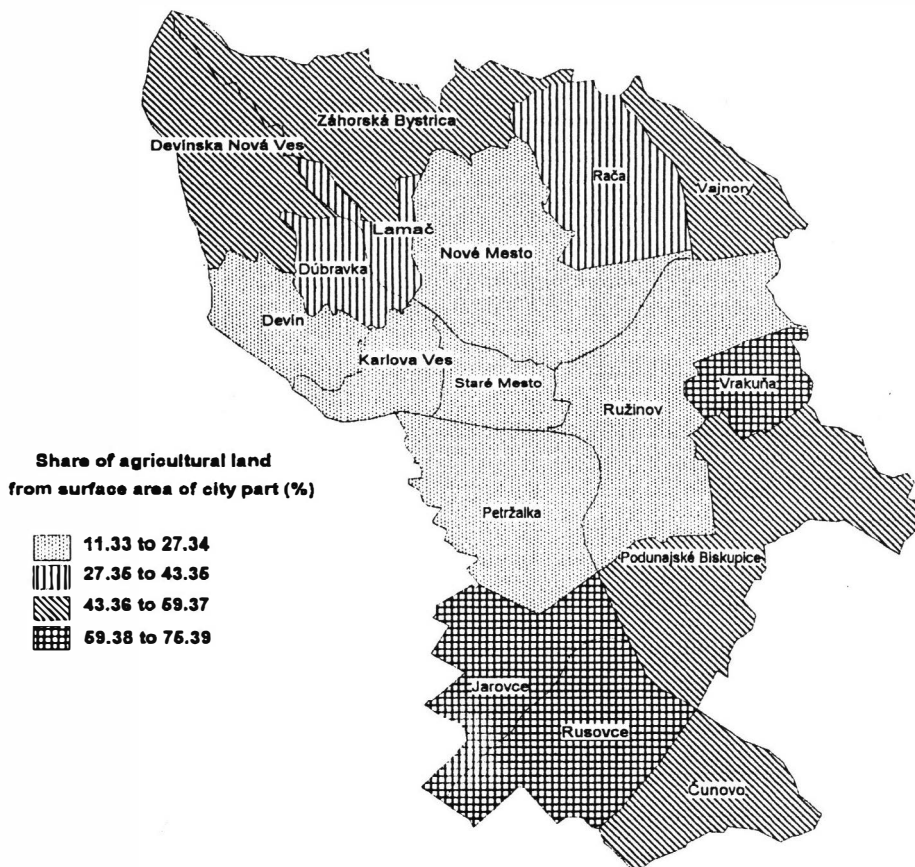


Fig. 2 Agricultural land in city parts of Bratislava

In spite of some barriers in formation of market zones, some specific areas can be determined, which are typical for internal agrostructures of a city. It is especially a central area Ružinov - Vrakuňa - Prievoz, where intensive vegetable growing and gardening is localised. More distant zones have been formed on the base of intensive fruit growing in the area of Vajnory, Vrakuňa, Ružinov, Podunajské Biskupice, Jarovce, Čunovo and Záhorská Bystrica. Their specialisation is mainly for thermopile kinds of fruits - peaches, apricots, but also for kinds typical for near to city fruit growing - apples, pears. Zone Vinohrady, Rača, Vajnory is the third highly specialised area for permanent cultures - vineyards. This specialisation is also in some boundary areas of the city - Devín, Podunajské Biskupice. Relatively the most of agricultural land takes area of mixed agriculture type - meat - milk - wheat, which is situated in the boundary parts of the city - Rusovce, Jarovce, Čunovo, Podunajské Biskupice, Vrakuňa, Vajnory, Záhorská Bystrica, Devínska Nová Ves (Figure 3).

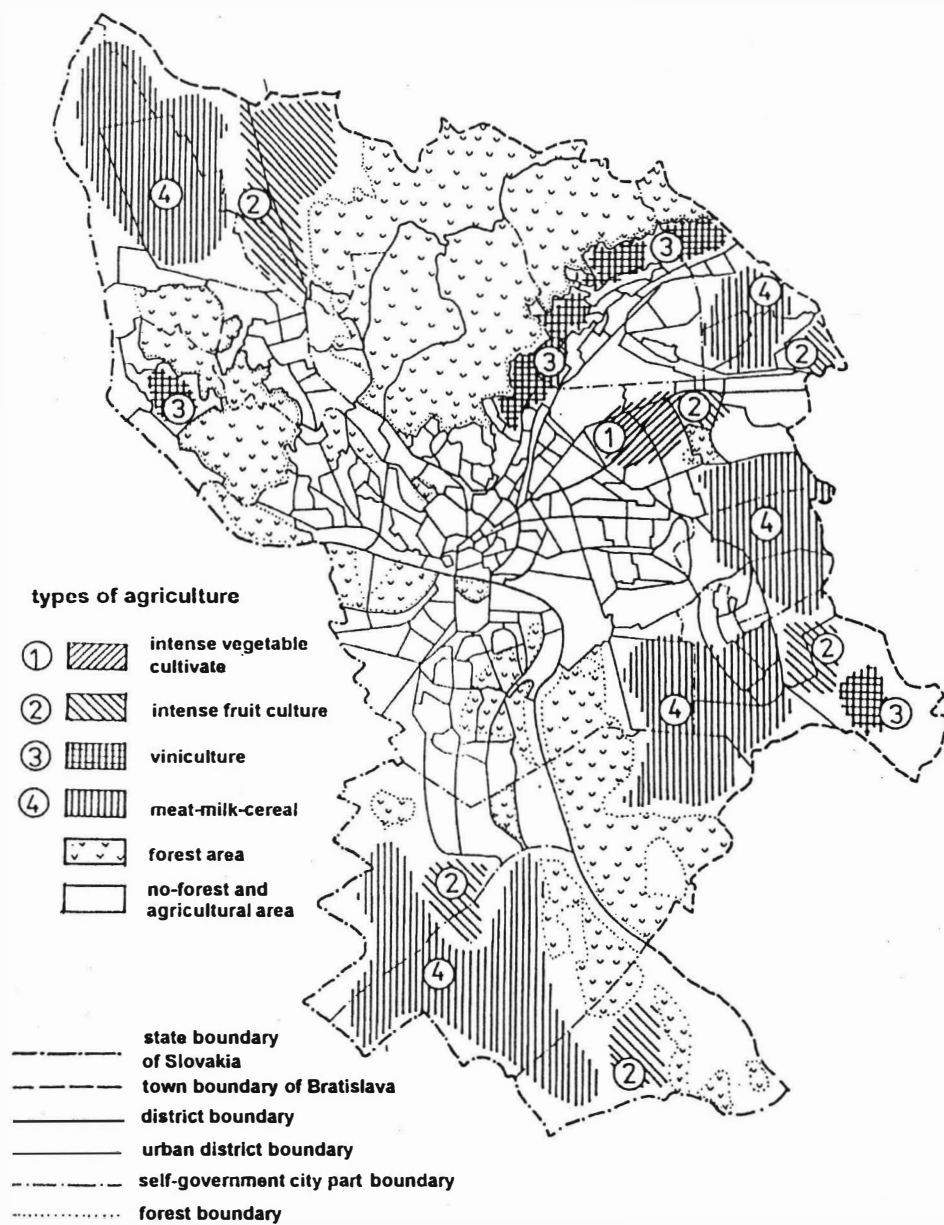


Fig. 3 Agriculture in Bratislava

## 4. CONCLUSION

We can conclude that present agrostructures in the area of Bratislava only partly follow Thünen's model of market centre. Its modification is caused by many natural, historical and political factors. Although land use documents significant portion of forest and agricultural land, function of the area is not adapted for the land use. Prognosis of agrostructures in a city shows their gradual moving to the city suburbs, or away from the city. Particular specialised agrozones and non-productive agrostructures of higher than regional influence will remain in the city.

**Table 1** Total distribution of land according to the districts in Bratislava (in ha, 1997)

District	Arable land	Vineyards	Gardens	Orchards	Permanently grassed areas	Agricultural land
Bratislava I	1	2	178		8	189
Bratislava II	3299	43	537	206	57	4142
Bratislava III	695	668	405	48	72	1888
Bratislava IV	2667	152	591	116	231	3757
Bratislava V	4548		143	151	68	4910
Total agricultural land in Bratislava	11210	865	1854	521	436	14886

Source: Statistic Yearbook of Capital City of the Slovak Republic Bratislava. ŠÚ SR, Bratislava, 1998.

**Table 2** Total distribution of land according to the districts in Bratislava (in %, 1997)

District	Arable land	Vineyards	Gardens	Orchards	Permanently grassed areas	Agricultural land
Bratislava I	0,01	0,23	9,6	0	1,83	1,27
Bratislava II	29,43	4,97	28,96	39,54	13,07	27,82
Bratislava III	6,2	77,23	21,84	9,21	16,51	12,68
Bratislava IV	23,79	17,57	31,88	22,26	52,98	25,24
Bratislava V	40,57	0	7,71	28,98	15,6	32,98
Total agricultural land in Bratislava	100	100	100	100	100	100

Source: Statistic Yearbook of Capital City of the Slovak Republic Bratislava. ŠÚ SR, Bratislava, 1998.

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## Resume

### Agroštruktúry Bratislavy

Formovanie agroštruktúr má svoje zákonitosti, ktoré sú odvodené od prírodných a spoločensko-ekonomických podmienok územia. Špeciálne sa agroštruktúry formujú v mestských a prímestských oblastiach. Myšlienky J. von Thünen, zakladateľa tržných mestských a prímestských agroštruktúr, sú aj v súčasnej geografii aktuálne.

V príspevku sa budeme zaoberať agroštruktúrami Bratislavy v jej katastrálnom území. Ak by sme chceli prispôsobiť Thünenov model tržného agrocentra má pre Bratislavu, boli by v ňom určité špecifiká. Nevytvárali sa tu pravidelné sústredné kružnice, ktoré by dokumentovali rôzne zamerania agroštruktúr, predovšetkým vďaka horskej bariére Malé Karpaty, excentrickej polohy voči územiu štátu (hraničná oblasť), vodnému toku Dunaj, ako aj rozdielnosťou agroekologických podmienok priľahlých nížin - Záhorská a Podunajská.

I napriek určitým bariéram pri vytváraní tržných koncentrických zón, možno pre k.ú. Bratislavy vyčleniť niekoľko špecifických oblastí, ktoré sú typické pre vnútornú agroštruktúru mesta. predovšetkým je to centrálna oblasť Ružinov-Vrakuňa-Prievoz, kde je lokalizované intenzívne zeleninárstvo a záhradníctvo. Ďalšie zóny sa tvorili na báze intenzívneho ovocinárstva v oblasti Vajnor, Vrakune, Ružinova, Podunajských Biskupíc, Jaroviec, Čunova a Záhorskej Bystrice. Treťou vyšpecializovanou oblasťou je podmalokarpatský pás - Vinohrady, Rača, Vajnory, ktorý má špeciálne zameranie na trvalé kultúry - vinohrady. Mozaikovité je táto špecializácie ešte v niektorých okrajových častiach mesta - Devín, Podunajské Biskupice. Relatívne najviac poľnohospodagroštruktúryárskej pôdy zaberá oblasť zmiešaného typu poľnohospodárstva - mäso-mliečno-obilninársky, ktorý sa viaže na okrajové časti mesta - Rusovce, Jarovce, Čunovo, Podunajské Biskupice, Vrakuňa, Vajnory, Záhorská Bystrica, Devínska Nová Ves.