



SPECIFIC FEATURES OF SPATIAL DISTRIBUTION AND RELATIVE DEGREE OF DEVELOPMENT OF AGRO-INDUSTRY IN VOJVODINA

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Abstract

The location quotient method was used to determine the degree of development of agro-industry in the individual communes relative to the Vojvodina as a whole. On the basis of the location quotient, the communes were then divided into groups to form a sequential series. On the basis of ranking within this series, it was possible to identify signifiers of agro-industrial distribution according to certain specific spatial models, viz.: **development axis, agglomeration, polycentrism and dispersion**. In addition to determining their characteristics, it was possible to identify the causes of such spatial distribution, as well as their advantages and shortcomings.

Key words: agro-industry, spatial distribution, development axis, agglomeration, polycentrism and dispersion.

Introduction

The term agro-industry covers the complex of industrial activities based on raw materials originating from agricultural production. These include the production, manufacture and processing of foodstuffs, liquors and soft drinks, animal feeds, tobacco, textile yarns, and leather and furs, with ancillary activities. Agro-industry represents one of the most important branches of industry in the Vojvodina and its economy in general. From the point of view of production technology, it is oriented towards the agrarian rural areas and major suppliers of raw material. On the other hand, it also *'has an affinity towards urban agglomerations, possesses propulsion characteristics, has a dynamic relationship with near and distant surroundings, and exposes inertia in the attempts of its dislocation'* (Brdarevska, 1995).

The Objective and Methodology of the Study

The objective of this study is to establish the pattern of geographic distribution of agro-industry in Vojvodina, with the possible identification of the known spatial models, on the basis of the degree of development in its particular elementary units (communes).

This can be quantitatively expressed by a relatively complex measure, known as the *location quotient*.

The location quotient (LQ) is calculated from the equation $LQ = (b:a)((BA)$, where:

a = the number of workers employed in the agro-industry of the given commune.

b = the number of workers employed in the agro-industry of Vojvodina.

B = the number of inhabitants of the commune.
 A = the number of inhabitants of the Vojvodina.

We are therefore dealing with a double quotient which does not show an absolute value, but only a measure of the relative significance of the agro-industry of each commune (region) vis-à-vis the average level of development of agro-industry in the Vojvodina. We acknowledge that the results thus obtained have certain shortcomings due to the fact that the statistically determined number of workers in the agro-industry of a given commune does not necessarily reflect the level of development of that commune's agro-industry.

First of all, the problem of inter-communal migration of labour, especially pronounced in regions with a big urban centre and a large and strong gravitational sphere, is neglected. Also, the labour-force can be considered as appropriate measure for industries with a low or intermediate level of technological involvement, whereas the key measure of development for industries involving a higher level of technology is of a different character. We therefore desired to avoid a strict and precise ranking of the communes, and hence we classified them only into groups, in the form of a sequential series. Data obtained from the 1991 census formed the basis for our calculations, because these are the most reliable figures available. This was also a time when *agro-industry* had attained a peak of development.

Specific Features of Spatial Distribution and the Relative Level of Agro-Industrial Development

The average value of location quotient for Vojvodina is **100**. The sequential series, comprising the communes classified according to the degree of their development, is displayed in Table 1. Each group, within a certain range, differs by a defined margin from the average level of agro-industry in Vojvodina.

Table I Sequential series of location quotient (LQ) of agro-industry per Vojvodina communes in 1991

Source: Calculated on the basis of the Statistical Form Ind21, The Provincial Bureau of Statistics, Novi Sad, 1992, and Census 1991 Population, households and families, data per settlements and communes, No 6, Federal Bureau of Statistics, Belgrade 1993

Analysis of the sequential series reveals that agro-industry is most heavily concentrated in urban settlements with more than 20,000 inhabitants. The spatial macro-distribution of this industry is thus to be identified with the actual distribution of such settlements. It is understandable that in a number of cases there are examples of departure from this situation. It can therefore be stated that the overall distribution of agro-industry is affected by a combination of the following models a) development axis, b) polycentrism, c) agglomeration, and d) dispersion.

Development Axis

While in the majority of examples, partly dependent on variety, agro-industry is linked with the relatively larger settlements, in the central **Backa** an almost classical example of industry **concentrating** along a certain development axis is to be observed, in this case along the Great **Backa** Canal which forms a principal element in the **Danube-Tisa-Danube** hydrosystem. Less

pronounced examples of the same kind may be found along the middle and upper reaches of the of the **Tisa** in Yugoslavia, and along the Danube valley. Constituent parts of the Backa Canal axis are facilities in Sombor, Crvenka, Kula, Vrbas, Srbobran and Becej. North of Becej, upstream along the Tisa, there is a certain continuation of this main axis with a concentration of agro-industry giving to this region the contours of a development axis. The agro-industrial centres are Novi Knezevac, Kanjiza, Senta, Mol, Coka, Ada and Novi Becej. With the exception of Srbobran, they are characterised by a location quotient (above 2.01) which is significantly above the Vojvodina average. Coka (4.29) and Senta (4.12) have particularly high location quotients among this group.

In principle, a main prerequisite for the formation and development of such axes is their position in relation to the infrastructure. The prospects for the development of an axis is in direct correlation to its characteristics, i.e. to the depth of penetration from the node to the districts of raw material supply, and to its stimulation of their formation or further development (specialisation of agricultural production, increase of area under cultivation, increases in yield, etc.). Watercourses, however, represent an important infrastructural and technological factor in the holistic evolution of development axes (Kresic, 1981).

The rationalisation of transport and improvements in transport conditions, principally by their impact on the transportation of raw materials central to agro-industry, also bring about enhancements in labour productivity. One should also point out the primarily technological need for large quantities of water, including the drawing-off from watercourses for the treatment of raw materials, and subsequent discharge of waters used for heating, cooling, or transportation purposes into natural water recipients. The development of complementary industries within a node's zone of attraction is therefore stimulated. These complementary industries may be an extension of pre-existing production activities, and may represent a range of levels of processing. At present, some regressive trends have become evident in the domain of processing.

Among the settlements situated along the Backa Canal, Vrbas belongs to the highest group (LQ 4.01). This is a consequence of a number of favourable geographic conditions, the most important being the developed agricultural surroundings and favourable infrastructural location at the junction of the Budapest-Subotica-Novı Sad - Beograd and Becej - Sombor railway lines. Thanks to these factors, by the beginning of the 19th century this town had already been transformed, from a staging-post with artisan character but a strong agrarian base, into a strong centre of food industry. The settlements of Kula and Crvenka within Kula commune have also a solid concentration of agro-industry (LQ 3.78). Srbobran, in contrast, belongs to a significantly lower category (LQ 1.72). The agro-industry of Srbobran has been based on the development of the 'Elan' company, whose period of strongest expansion was registered when it belonged to the complex economic system 'Danube-Tisa-Danube'.

Of the settlements along the Tisa, Senta and Coka belong to the highest group. Senta has had an agrarian character for a relatively long period, which has underlain the present substantial agro-industry. This agrarian character has been based on the one hand on the fertile loess plateau to the west, and on the alluvial flood plain of the Tisa on the other. A bridge over the Tisa was constructed in 1910 linking Senta with the Banat. After World War I, the northern part of the Banat - except a compressed hinterland - was separated from the influence of Szeged. The northern part of what had become the Yugoslav Banat now found itself in the gravitational sphere of Senta, and this had a strong impact on the development of that town. A stronger industrial development occurred after World War II, featuring the updating and expansion of existing facilities in the food industry, and the construction of new plants. The growth of Kikinda, however, led to the capture by that town of much of the northern Banat into its own gravitational sphere, and the consequent contraction of the regional influence of Senta. The importance of the agro-industry of Coka, however, has been based on meat processing, whose significance far exceeds the size of the settlement.

Agglomeration

Novi Sad, as the socio-economic and administrative centre of Vojvodina, is characterized by agglomeration of agro-industrial businesses within the city and its closest surroundings. The city acts as a magnet and meeting-place for very numerous and diverse centres of economic and non-economic activities. In view of a complex and closely related range of spatial activities, this city has become a particular node of development. In terms of centrality, Novi Sad is the only macro-regional centre of Vojvodina with a nodal influence. This influence is constantly on the increase, and extending over an ever wider area as a consequence of a strengthening and multiplication of metropolitan functions which has occurred particularly in the seventies and eighties. For a city of the size of Novi Sad, this should, however occasion no surprise. The agro-industry located in the city itself and in its closest surroundings is based primarily on the highly concentrated market, so that the character of this industry itself is orientated towards satisfying the needs of the conurbation, but also of external markets.

Polycentrism

Polycentrism is characteristic of the settlements with more than 20,000 inhabitants, such as Backa Palanka, Subotica, Kikinda, Zrenjanin, Sremska Mitrovica, Pancevo, Vrsac, etc. A polycentric distribution of the agro-industry has the principle advantage of representing a mean, and an almost ideal equilibrium between two opposites - agglomeration and dispersion. This assertion is based on polycentric distribution representing an optimal amalgamation of more locational factors whereby each centre possesses those kind of facilities which correspond to the specific features and resources of that centre. However, the choice of nodes in a system of polycentric development does not mean a constant and exclusive concentration of new facilities in them, or the neglect of other settlements, but that they should also represent nodes for specific kinds of development. A polycentric pattern of distribution also offers a chance to exploit the advantages of the external economies of urban areas, thus diminishing the tendency to dispersion, which is often unplanned and irrational.

In terms of the relative development of their agro-industry, the most important settlements in this category are Backa Palanka (LQ 4.83), Subotica (LQ 4.81), Kikinda (LQ 4.47) and Zrenjanin (LQ=4.12). **Backa Palanka** is a relatively small town which, together with its surroundings, has a highest degree of industrialisation. This is based on its favourable location on the Danube, the solid agricultural basis of the surroundings and a strong pre-war (mainly German) artisan base.

Up until 1918 **Subotica**, along with Timisoara, was a macro-gravitational and administrative centre of Vojvodina, whose influence extended also throughout Banat. After the establishment of the post WW1 borders, this role was taken over by Novi Sad. The beginnings of industry in Subotica are to be found in the second half of the 18th century when, after the construction of the first railways, this town was drawn into intensive trade on the Hungarian market. First to develop was the flour-mill industry, and then other branches of the food industry. The presence of agro-industry in the Subotica region today stems not only from a substantial base of local primary raw material production, but also from a substantial inheritance of old establishments for basic food production (location- inertia).

In respect of its magnitude and diversity, **Zrenjanin** has always had, (especially true during the seventies and eighties), one of the most developed agro-industries in the county (Agro-industrial Complex 'Servo Mihalj'). This has been based on the combination of a number of favourable circumstances. Firstly, its location astride the only main road in the Yugoslav Banat, secondly, its

proximity to the confluence of the Begej and the Tisa rivers, and thirdly, the nearness of the junction between the and the border of the loess terrace and the Tisa valley, both of which are eminently suited for the production of a diverse range of agricultural raw materials.

The only really industrial and agro-industrial centre in Srem is **Sremska Mitrovica**. The development of this town has also been based on several favourable circumstances. In this case, a location on the left edge of the Srem loess terrace and alluvial plain of the Sava, at a point where the riverbed narrowed, made possible the use of the both river banks. Its situation beside a navigable and relatively major watercourse was attractive for trade. The closeness of the Slavonian and Fruska Gora forests underlay the development of the timber industry. The town also became the centre of an important agricultural complex. All these factors combined to attract agro-industrial facilities.

Dispersion

Dispersion is common in some sections of the agro-industrial sector, particularly those characterised by a great dispersion of relevant raw materials, or of the market demand for the product, such as the flour industry, meat industry and the production of animal feed. These industries are characteristic of some of the smaller communes, with a quotient of mainly between 1.01 and 2.00. To a smaller extent, these industries are also characteristic of the areas are below the 100 index level for Vojvodina Province, such as Kovin, Plandiste, Temerin, Zitiste, etc.

An excessive dispersion has been observed in the distribution pattern of some industries, which has occasionally resulted in duplication of investment, difficulties in the supply of raw materials, excess of supply over demand, an inefficient use of production capacity, low productivity and, in years of agricultural / general economic depression and reduced consumption, also in drastic production losses and even the closure of some facilities. In Vojvodina, this phenomenon has been characteristic principally of some of the smaller places which, ambitiously striking out on a path of strong economic development, have sought to achieve economic self-sufficiency and constructed agroindustrial facilities under sub-optimal locational conditions. In more recent times, these tendencies have also affected some major agro-industrial centres, some of which have formerly been very successful.

Conclusion

Agro-industry is the most important economic branch of Vojvodina, with the lower stages of manufacturing predominant. It is concentrated mainly in the urban settlements, where the advantages of a developed infrastructure and concentrated market can be exploited, with the proviso the urban centre must have a sound raw materials base within its gravitational sphere. The models of the spatial distribution of agro-industry therefore mainly coincide with the particular distribution of towns in the Vojvodina. The highest concentration is observed in the larger town centres, whereas the industries with a dispersed market are characteristic also of those smaller urban and rural environments possessing the necessary locational conditions.

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