ISSUES OF SPECIALIZATION OF GREENHOUSE VEGETABLE PRODUCTION IN BULGARIA

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Abstract

Subject matter of scientific research are basic issues of the specialization of greenhouse vegetable production in national and regional aspect.

The methodology used contains a system of indicators for establishing and characterizing the sectoral and regional specialization of greenhouse vegetable production (conventional and biological) in Bulgaria. In the present study the assessment at the level of specialization was done using the indicators approved in the economic literature: coefficient of the sectoral structure of the regional economy; location factor of the sectors in the region and absolute regional specialization coefficient.

Finally, it is noted that the practical use of regional specialization would allow competent policy makers to draw up a science-based strategy for establishing national agrarian priorities as an initial stage in developing a unified national doctrine on agricultural development.

Keywords: branch specialization, greenhouse vegetable production, conventional, organic.

1. Classification and place of greenhouse organic vegetable production in the national economy

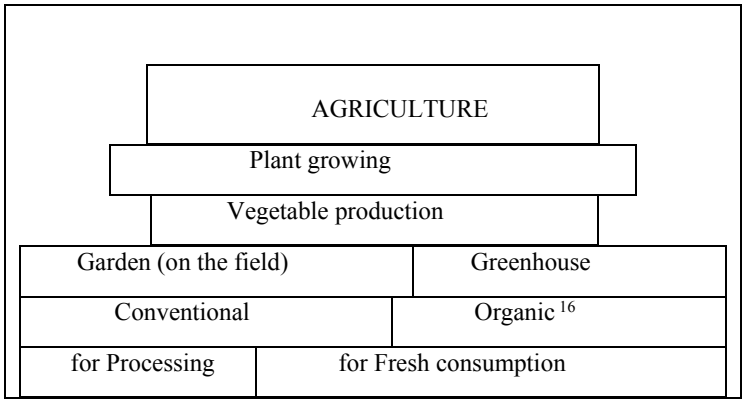
The term "organic farming" has been introduced through the basic organic production standards formulated by the International Federation of Organic Farming Movements (IFOAM [2]). The term "organic farming" has been established in English-speaking countries as a method that respects environmental principles of production. In Germany, Sweden, Denmark, Norway, the term "organic farming" is used. On the basis of these traditions, the European Commission includes in Regulation 2092/91 the three terms (organic, ecological, biological), incl. redundancies such as "bio" or "eco" in the official European languages. In Bulgaria it is accepted to use the term "organic farming" [4]. According to information from the Agrostatistics Department of the Ministry of Agriculture Food and Forestry, based on official instructions of Eurostat, the following official classification of vegetables is made [6]

Garden vegetables - All vegetables grown under field conditions and crop rotation with other crops other than vegetables are included. Also included are the areas of vegetables grown under low glass or polyethylene coatings. Excluding: fresh vegetables grown as a second crop and vegetables grown as fodder crops.

Garden fresh vegetables - This heading covers areas planted with vegetables, melons, melons grown mostly in specialized vegetable farms. These vegetables are grown in garden conditions (vegetable gardens) and are only rooted in crop rotation with other vegetable crops. Note the total area of the plots. Also included are the areas of vegetables grown under low glass or polyethylene coatings.

Vegetables grown under tall greenhouses (including strawberries) - glass and polythene greenhouses. The total area covered by the greenhouses in which there was vegetable production during the agricultural campaign should be included here. The total covered area includes crops, paths and area occupied by the heating installation.

"Agriculture" according to the processing methodology of data from the Agrostatistics Department of the Ministry of Agriculture Food and Forestry is divided into three sectors: the sector "Livestock", the "Agricultural services" sector and the "Non-agricultural activities" sector. Vegetable production is a sub-sector of the "Plant-growing" sector. Here are the garden and greenhouse vegetables, which in turn are subdivided into conventional and organic production, producing produce for processing and fresh consumption (Figure 1).



Source: National Statistical Institute -2010-2017

Figure 1. Sectoral Positioning of Greenhouse Organic Vegetable Production

The main structural indicator determining the place of greenhouse organic production in the national economy is the ratio "Gross revenues" of greenhouse organic farms to "Gross output", realized in the sector "Crop production", respectively "Vegetable production" subsector.

Due to the lack of data on the value of gross organic production of agriculture, gross organic production of crop production and gross production of organic vegetable production, additional indicators were used in this study:

The place of the "Greenhouse Vegetable Growing Sector" sector in the structure of the "Agriculture" sector is determined on the basis of data on the number of holdings - conventional and organic) and the utilized agricultural area under vegetable crops (Table 1).

1. Holdings with organic vegetables: Vegetable holdings = = (363/30441) 100 = 1.19%
2. Organic Farming Holdings: Bio-Growth Holdings = (363: 4548) 100 = 8%
3. Organic holdings: Holdings total = (363: 184448) 100 = 0.2%
4. Organic greenhouse holdings: Vegetable holdings = (6: 30441) 100 = 0.02%

[16] the terms "bio", "eco", "organic" and "natural" are not synonymous, but each must be accompanied by certificate details - the BGBIO02 certification code and the certification system logo to refer to subsector, respectively to the group of bio products. The label on a bioproduct must contain: •The words "organic", "organic" or their derivatives - "bio", "eco", and their equivalents in Latin.

Table 1. Holdings with Utilized Agricultural Area (UAA) 2016 (numbers**)**

Indicators	(no.)
Agriculture	18444
including organic production	7262
Organic plant production	4548
Vegetables	30441
including. Outdoor	28231
Field	15438
Garden	13557
under tall greenhouses	4301
organic greenhouse production	6

Source: Agrarian Report 2017

Table 2. Number of agricultural holdings and UAA by region-2016

Regions	Total Farms	Farms with UAA	UAA
	(no.)	(no.)	(ha)
Bulgaria	201014	184448	3795534
Northwest	22205	18464	809920
Northern central	22855	20422	718831
Northeastern	22421	18723	742591
Southeast	27860	24907	736394
Southwest	42134	40899	302084
South central	63539	61033	485713

Source: Agrarian Report 2017

Table 3. Holdings of Bioproducers in Bulgaria (no.)

№	Regions	Agriculture	Plant growing	Vegetable productio
1	Northwest	587	402	43
2	Northern central	1431	683	38
3	Northeastern	1334	744	36
4	Southeastern	1254	987	50
5	Southwest	1070	670	70
6	South central	1285	1062	126
	Bulgaria	6961	4548	363

Source: Register of organic producers, Ministry of Food and Forestry

Organic growers only (4548) account for 65.3% of all organic farmers in the *Ministry of Food and Forestry*, which are 6961. Plant breeders are 4548, of which vegetable producers are 363 (8.0%) and in the total number of organic farmers alone their share is 5.2%. If vegetable bio processors, traders and subcontractors are added to the organic operators in the vegetable sector, their share grows to 52.8% of all bio operators in agriculture.

The inventory lacks economic data for greenhouse growers and for this reason they are expertly identified by their production profile only to the leading companies with annual financial reports. Since the information about the beneficiaries of organic greenhouse gas subsidies stored in State Fund "Agriculture" - Paying Agency is not officially published and its use according to the Access to Public Information Act (APIA) is not allowed because of the confidentiality of the personal data of the owners of the companies, it is impossible to report to organic glasshouse producers in the country.

The location of greenhouse organic farming in the national economy is wrong to be determined on the basis of the UAA, because the size of the areas under organic vegetables in greenhouses is relatively small compared to the conventional agriculture of garden (organic) vegetables. The area of vegetables in the control system (organic producers in the agricultural sector) is 3678 ha (Table 4), and the organic vegetable producers' holdings are 363, ie. An average of 100 decares per holding on a total area of less than 1 greenhouse for organic production in the country on average, this information is not taken into account in the national statistics. For this reason, the benchmark "number of holdings of bio producers" was adopted as the basis for a relatively real operational analysis.

Table 4. Utilized agricultural area 2016g. (thousand ha)

Indicators	UAA
Agriculture	3795,5
including bio-production	162,4
Vegetables	60.3
Including. open areas	59,3
Greenhouses	1.0
including. organic production	3,678

Source: Agrarian Report 2017.

2. Specialization of organic vegetable production in Bulgaria

Regional indexes are used for regional analysis and comparisons. An essential feature of these indices is the fact that they express differences in place of two static sets at a given time or period. In the opinion of a large number of specialists and researchers, to characterize regional specialization, it is best to use the following key indicators [7].

- **Index at regional specialization level by sector.** It is calculated as the ratio between the relative share of the gross output of the given sector in the region on the one hand in the gross output of the same sector for the country and the share of the region in the country on the basis of gross output on the other;
- **Efficiency Index of specialization**. It is defined as the ratio between gross output per unit cost in the region to the same country indicator;
- **A general index of specialization, as a work from the previous two private indexes.**

The analysis of regional specialization [5] can be done on the basis of gross (gross) output, gross value added, output, equity, etc. Depending on the specificity of the sector, other indicators may also be used - arable land, number of holdings, etc. In the quantitative

analysis in practice, the assessment of regional specialization should be considered in a complex way, all three indicators being analyzed in their relationship and dependence.

The sectoral structure of the regional economy is determined by the formula:

$$K_{rs} = \frac{q_{ir}}{Q_r}$$

K_{rs} - coefficient of sectoral structure of the regional economy;

q_{ir} - total (gross) output (gross value added) per sector i in a region *r*;

Q_r - gross output (gross value added) in a region *r*.

In order to characterize the role of the sectors of the region in the national economy, the location coefficient is also used. Location (I place on, on, I have a specific location). The term is used to refer to a process related to the placement of productions and activities in a particular territory [1].

In essence, this is a regional specialization index but considered separately from the other two indicators characterizing regional specialization, it quantifies the territorial location of the analyzed sectors in the national economy without taking into account the efficiency of the specialization. The location coefficient of the sectors in the region is determined by the formula [3]:

$$K_{ir} = \frac{q_{ir}}{Q_r} : \frac{q_i}{Q}$$

Kir - a factor of location of production of the sectors in the region;
qi - gross output of sector i in the country;
qir - gross output per sector ***i*** in the region ***r***;
Qr - gross production in the region ***r***.
Q - gross output in the country.

The greater and more pronounced the location (or specialization) of the given sector in the region, the higher the numerical value of the coefficient. Indicators such as gross output, gross value added, equity, staffing, etc. may be used to determine this factor. In this study, the number of farms was used for this purpose due to the lack of official statistics on basic economic indicators of organic vegetable production.

A key indicator for regional specialization measurement is the coefficient of absolute regional specialization H_J^S.

$$H_J^S = \sum_i S_{ij} = \sum_i \frac{E_{ij}}{E_j} = \sum_i \frac{Eij}{\sum_i E_{ij}}$$

Sij - relative share of gross output in a sub-sector ***i*** of the agro-sector in the particular region ***j*** of the gross production of the region;
Eij - gross output in sub-sector *i* of the agro-sector in the region ***j***;

$E_j = \sum_i E_{ij}$ -gross output from the agro-sector in the region j.

The meanings of S_{ij} range from 0 to 1. At coefficients close to 1, the region is highly specialized. When the coefficient values are close to 0, the specialization of the region is very low. The maximum value of the indicator is obtained only when the regional specialization is absolute, ie. there is only one sector in the region.

For the analysis and characterization of the regional specialization of organic vegetable production, the following indicators were used in the present study:

a) Regional Specialization Index of Organic Vegetable Production (Ic_{vp})

$$Ic_{vp} = \frac{\text{Nbvr.100}}{\text{Nbvc}} : \frac{\text{Nbvc.100}}{\text{Nac}}$$

N_{bvr} - number of holdings of organic growers in the area;
N_{bvc} - number of holdings of organic growers in the country;
N_{ac} - number of agricultural holdings in the country.

Table 5. Ic_{vp} by region

Regions	**Ic_{vp}**
Southwest	0.347121764
South central	0.643621603
Southeastern	0.376048577
Northeastern	0.303731543
Northwest	0.195255992
Northern central	0.209719399

Source: National Statistical Institute -2017

As can be seen from Table 5, the index at the level of the regional specialization of organic vegetable production by regions in the country is highest in the South-Central Region - 0.643621603. There the concentration of the producers of organic production in the vegetable production is the highest, as there are the most favorable conditions for the development of the vegetable production in the country. Table 6 below presents the specialization of organic farmers by region in this area.

Table 6. Ic_{vp} in the South-Central Region by Districts

Regions and **districts**	, **Ic_{vp}**
South Central Region	0.643621603
Haskovo	0.376048577
Plovdiv	0.151865772
Pazardzhik	0.086780441
Kardzhali	0.028926814
Smolyan	0

Source: Agrarian Report 2017

Table 6 shows that the highest indicator of the regional specialization coefficient was Haskovo-0.376048577, followed by Plovdiv and Pazardzhik. The zero coefficient is Smolyan region due to the lack of organic growers in this area.

When comparing the ICB indicators in the different regions of the country it is found that this coefficient is relatively higher in Blagoevgrad (0.231414509), Plovdiv (0.151865772) and Pazardzhik (0.086780441). These are the main suppliers of organic production of vegetables for the capital, as the largest consumer of this type of production (mostly greenhouse production), unlike the organic farmers from Haskovo region, which are of the garden type of cultivation.

Table 7. Icir in Southeastern Region by districts

Regions and districts	**Ic_{vp}**
Southeast region	0.376048577
Bourgas	0.144634068
Sliven	0.072317034
Stara Zagora	0.122938958
Yambol	0.036158517

Source: Agrarian Report 2017

Table 8. Ic_{vp} in the Southwest Area by Districts

Regions and districts	**Ic_{vp}**
Southwest region	0.347121764
Blagoevgrad	0.231414509
Kyustendil	0.043390220
Pernik	0.007231703
Sofia	0.065085331

Source: Agrarian Report 2017

Table 9. Ic_{vp} in the North-East region by district

Regions and districts	**Ic_{vp}**
North-East region	0.303731543
Varna	0.10847555
Dobrich	0.0
Targovishte	0.01446341
Shumen	0.07231703

Source: Agrarian Report 2017

Table 10. Ic_{vp} in the Northwest region by districts

Regions and districts	**Ic_{vp}**
Northwest region	0.195255992
Vidin	0.043390220
Vratsa	0.028926814
Montana	0.043390220
Lovech	0.014463407
Pleven	0.065085331

Source: Agrarian Report 2017

Table 11. Ic_{vp} in North Central Region by Districts

Regions and districts	Ic_{vp}
North Central Region	0.209719399
Veliko Tarnovo	0.007231703
Gabrovo	0.007231703
Razgrad	0.043390220
Ruse	0.043390220
Silistra	0.108475551

Source: Agrarian Report 2017

b) Index of the effect of the specialization of vegetable production.

Due to the lack of information in the NSI and other institutions accumulating economic information on the production costs in the agrarian sector, the present study uses an indicator that takes into account the effect of specialization, namely "standard production volume". The required cost information can only be obtained from individual survey surveys.

The index of the effect of specialization on organic farming is determined by the formula: $IEvp=TCP_{bva} : TCP_{bvc}$

TSP_{bva} - total standard production volume of farms from organic farming in the area;

TSP_{bvc} - total standard production volume of the farms specializing in vegetable production in the country.

The overall biomedical production specialization index is a product of the two indices: the Regional Specialization Index of Organic Vegetable Production (Ic_{vp}) and the Index of Effects of the Specialization of Organic Growth (*IEvp*).

$TIC = Ic_{vp} . IEvp$

Table 12. General organic specialization index vegetable production in Bulgaria

№	Regions	Ic_{vp}	*IEvp*	*TIC*
1	South central	0.06228132	0.455	0.028339906
2	Southwest	0.04490178	0.211	0.009458116
3	Northeastern	0.06976744	0.102	0.00712959
4	Southeast	0.05143422	0.134	0.006895054
5	Northern central	0.03940143	0.109	0.004277806
6	Northwest	0.00347222	0.05	0.00017274

Source: Agrarian Report 2017

There are no organic vegetable growers in Smolyan and Dobrich regions, so the coefficients of both indices are zero. Table 12 shows that the highest overall index of specialization of organic vegetable production in Bulgaria is registered in the South-Central Region, followed by the Southwest Region and the North-East Region. In all three regions, there are the largest organic vegetable growers and logically the overall results are the most significant. Here are the largest cities in the country and the largest consumer centers of this production - Sofia, Plovdiv and Varna.

Finally, it is noted that the practical use of regional specialization would allow the competent agrarian policy institutions to draw up a science-based strategy for establishing national agrarian priorities as an initial stage in developing a unified national doctrine on agricultural development.

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