

# Regional transformations in Bulgaria and challenges for sustainable development

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**Abstract.** Structural changes in rural areas are a subject of widespread discussion. During the transition to a market economy, Bulgarian agriculture underwent serious reforms, and after the accession to the EU, the transformations of the sector became even more significant. Political and socio-economic changes have an impact on agricultural production, organisational structure, and market performance. These processes have played an essential role in the development of rural areas. The aim of the study is based on an analysis of structural changes in Bulgarian agriculture, to outline their impact on the models of transformation of rural areas and make recommendations for sustainable development. Significant changes are observed during the analysed period. The agricultural sector remains polarised and dominated by several significant sub-sectors – cereals and oilseeds. The Common Agricultural Policy (CAP) does not contribute to balanced and sustainable development and deepens disparities. During the new programming period, the opportunities for modelling the CAP are significant and vary considerably. A new conceptual framework needs to be implemented in Bulgaria - the local model related to regional specifics can solve some of the challenges.

## 1 Introduction

Different surveys and authors have studied structural changes in rural areas. Several international working groups and forums are exploring the central role that rural transformation will play in the future [34].

During the transition to a market economy, Bulgarian agriculture has undergone serious reforms related to land ownership, privatisation, restructuring, and market liberalisation. After the accession to the EU, transformations of the sector have become even more significant.

Political and socio-economic changes impact agricultural production, the organisational structure of the sector, and market performance. These processes have played an important role in the development of rural areas. In the context of the post-2020 period, although

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agriculture is at the heart of the relevant policy, rural development strategies should bring together the different rural economy sectors.

The study aims to outline the structural changes in Bulgarian agriculture, based on which to analyse their impact on the rural regions' transformation patterns and draw recommendations for their sustainable development.

Data from the National Statistical Institute (NSI) and the Ministry of Agriculture, Food and Forestry for the past sixty years are used in the research.

Structural change is defined as "a complex, intertwined phenomenon, not only because economic growth brings about complementary changes in various aspects of the economy, such as the sector compositions of output and employment" [34]. Structural transformations in the agricultural sector are considered as changes in the number of farms, economic activities, production structure, and farmers' attitudes [56].

The most theoretical and empirical literature on structural changes focuses on the transition from a predominantly agricultural to an industrialised economy in rural regions [17]. Globally, the structure of agricultural production has changed dramatically [23]. The first transformation is associated with the emigration of labour from the agricultural sector [31]. The second process is related to the reduction of the number of agricultural holdings. It generates farm cooperation and land consolidation [32, 64]. In parallel with these structural transformations, there are serious challenges related to "land grabbing". Currently, there is a rapid land concentration in Europe. This process affects the lives and livelihoods of small farmers and agricultural workers in rural areas [61].

On this basis, structural changes are linked to resources and support and regional development and employment in rural areas, agricultural land, biodiversity, and environmental protection [50].

Rural areas play a vital role in the EU, where 44% of the territory is classified as predominantly rural [19]. Despite their diversity, these regions in Europe have some common features and patterns. In most of these territories, agriculture is the main source of income and employment [24].

In parallel with agricultural transformations, there are changes in the rural economy and all aspects of rural life. Thus, rural labour markets, especially the employment structure, are strongly influenced by the low level of business initiatives [14]. The latter is a prerequisite for poverty to be another characteristic of rural areas. With over 75% of the world's poorest people living in rural areas, it is a widespread challenge [34].

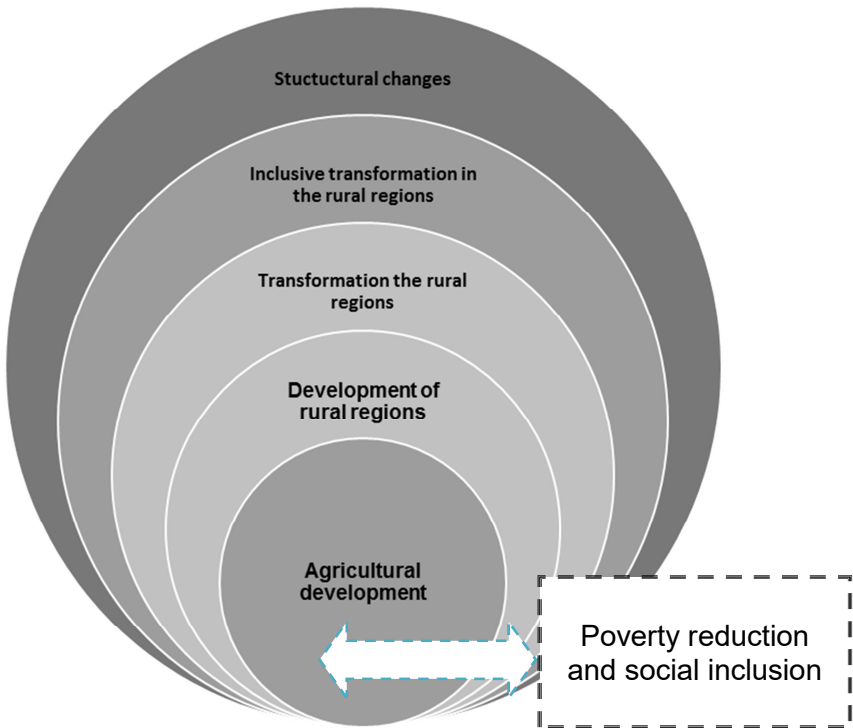
However, rural poverty and disparities are considered to be qualitatively "different" from those in urban areas, as they are invisible or irrelevant to most policymakers [10, 12, 13, 39, 49]. Nowadays, poverty and social exclusion are at the centre of discussions, and overcoming these challenges is part of the Sustainable Development Goals, adopted by the United Nations [62]. The so-called 'working poor' are another object of research interest [53]. Some transformations in rural areas are seen as a source of instability and do not lead to sustainable development. Rauch et al. [3] present a general definition of rural transformation as "a long-term multidimensional process of changing the key characteristics of the economic and social life of the rural population".

The concept of sustainable agricultural development became a widespread topic in the 1980s. The definitions for sustainable development differ, reflecting various dimensions, priorities, and goals [51, 69]. The concept of sustainable development covers different aspects of agriculture in different regional and national contexts [69]. However, the three pillars of sustainability - environmental, social, and economic, are globally acknowledged [22]. The global challenges require political action to reshape the relationships between the economy, society, and the environment. Therefore, a need for long-term investments in sustainable development, low-carbon economic infrastructure, and strengthening the transformative capacity of economies is acknowledged [63]. Julio Berdegué et al. [8] focus

on the importance of rural communities in these processes. The authors state that “the transformation in rural areas can be defined as a process of comprehensive social change in which rural societies diversify their economies and reduce their dependence on agriculture” [8]. These definitions highlighted the long-term nature of the structural changes in rural areas and linked these processes to national and global dynamics [7].

An IFAD report [34] addresses the challenges of structural change in agriculture and rural areas. The study provides definitions of the basic concepts related to agricultural and rural transformation and their relationship (figure1). Rural transformation is not an isolated process and is part of a broader concept of structural transformation related to the links between the agricultural and non-agricultural economies, as shown in Figure 1. While rural transformations could lead to both positive and negative effects on the rural population, the process of social inclusion is essential and does not happen automatically. Although changes in rural areas depend on agriculture, they require an effective social policy.

The OECD [45] has formulated various priorities for rural development related to the „transition from a sectorial to a territorial policy approach, including attempts to integrate different sectoral policies at a regional and local level to improve coordination at the government level". In 2016 OECD [46] reconsidered these priorities in the context of climate actions, innovations, and demographic changes.



**Fig. 1.** Links between structural changes and rural development. Source: IFAD [34].

Rural transformation can lead to diversification and economic growth. However, this growth is still unequal. Disparities between rural and urban areas within countries are becoming a significant challenge [19, 59]. Therefore, rural development can no longer be seen only in the context of rural development programs. In order to avoid depopulation and reduce poverty, especially in remote rural areas, governments are developing a number of policies addressing specific challenges and opportunities [5]. Community-led local

development primarily reflects these processes at the EU level. The latter contributes to the development of social capital and the support of various initiatives in rural areas [48, 57].

During the transition period in Eastern European countries, structural changes are the subject of serious debate among researchers, farmers, and politicians [21, 25]. In the last thirty years, Bulgarian rural regions have undergone substantial transformations. According to some authors [6, 7, 41], there are significant variations among the regions in the country, as well as significant intra-regional differences. The transformations to sustainable development have a tighter time frame because of challenges like climate change, and increasing competition for resources, and food security [18]. In this regard, the government's actions are the driving force in the transition to sustainable development and green growth.

2 Materials and methods

The analysis of the regional aspects is conducted based on the Classification of Territorial Units for Statistics in Bulgaria. Based on Regulation (EC) 176/2008 [54] Bulgaria is divided into six statistical regions. In order to ensure comparability of the data for the two periods of analysis, 28 districts, which were created as a result of a decree of the Presidium of the National Assembly in 1959, were transformed into the current six planning regions (Figure 2).



Fig. 2. Classification of Territorial Units for Statistics in Bulgaria (NUTS2). Source: [54].

Due to the complexity of the concept, the empirical research on structural changes in agriculture presents a very broad methodological framework [27, 30]. A number of studies applied various indicators to analyse structural changes in the economy. [1, 4, 9, 28, 36, 50, 67]. However, all these surveys focus on the regional features of the processes or different industrial sectors. The above-mentioned methodological frameworks do not outline specific characteristics of agriculture. Therefore, our study aims to apply indicators that take into account these features.

## 2.1 Specialisation rate (SR)

The Specialisation rate is a widely applied indicator for measuring structural changes and transformations at a national and regional level. The relative share of the agricultural sector in a country/region is divided on a specific basis [64]. In the current study, the Specialisation rate (SR) dynamics are analysed and divided into ten stages.

$$SR = \frac{x_{ij}}{x_j} \quad (1)$$

Where SR is the Specialization rate

$x_{ij}$  – relative share of GVA from agriculture in region  $i$

$x_j$  - relative share of GVA from agriculture at the national level

The relative share of the agricultural sector in gross value added (GVA) from the previous period is applied as a base in the study. The indicator varies from 0 to infinity. If the ratio is above 1, the role of agriculture in the national economy is increasing.

## 2.2 Herfindahl index

Herfindahl index was originally used as an indicator to assess the level of competition between companies [38]. The index has also widely been used as an indicator for the calculation of the level of specialisation, concentration, and transformation [11, 28, and 67].

$$Hs = \sum (g_{ij})^2 \quad (2)$$

$$g_{ij} = \frac{x_{ij}}{\sum x_{ij}} = \frac{x_{ij}}{x_i} \quad (3)$$

$Hs$  - Herfindahl index

$g_{ij}$  – the relative share of gross output in the  $j$  sector of the agriculture in region  $i$

$x_{ij}$  - gross output in the  $j$  sector of the agricultural sector in region  $i$

$x_i$  - gross output of the agricultural sector in the region  $i$

The indicator varies from 0 to 1. Values closer to 1 indicate a higher level of specialisation and concentration.

Due to the specifics of agricultural production, the equation is modified – instead of the classical form that applies GVA, gross output is used as a base.

## 2.3 Coefficient of structural differences and integral coefficient of structural differences

Systematised by Gatev [26], the indexes are used for measuring structural changes and differences. They are widely applied in analysing the dynamics of macroeconomic indicators [52, 58, and 60] and in assessing regional differences [33, 43, 65]. In agriculture, these indicators are used by a number of authors [35, 37, 66].

The coefficient of structural differences observes the general characteristics of the structural changes and measures the intensity of these changes [43].

$$Ki = \frac{1}{2} \sum |v_t - v_0| \quad (4)$$

where  $K_i$  is the coefficient of structural differences

$v_0$  is the relative share of GVA from the agricultural sector of region  $i$  in GVA of the agricultural sector in the country for the first period

$v_t$  is the relative share of GVA from the agricultural sector of region  $i$  in GVA of the agricultural sector in the country for the second period

The coefficient varies from 0 to 1, as the index closer to 1 shows larger transformation and structural changes.

The integral coefficient of structural differences is used to assess the transformations between two periods of time regarding the relationship between the absolute and the relative changes in the agricultural structure. The differences in relative shares are adjusted according to the size of the relative shares of the squares from which they are formed [43]:

$$K_d = \sqrt{\frac{\sum \frac{(v_t - v_0)^2}{v_0^2 + \sum v_t^2}}{\sum}} \quad (5)$$

where  $K_d$  is the integral coefficient of structural differences

3 Results and discussion

Regarding the indicator Specialisation rate, the results show significant changes in the role of agriculture in the national economy (Figure 3).

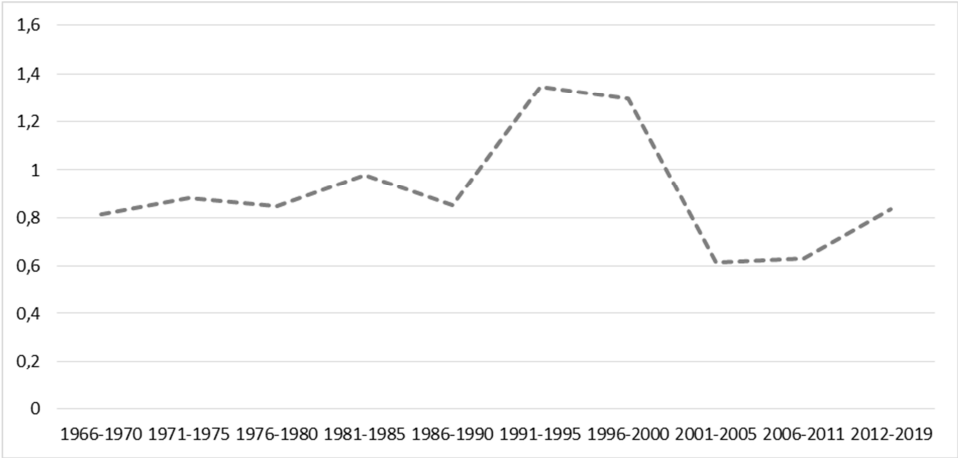


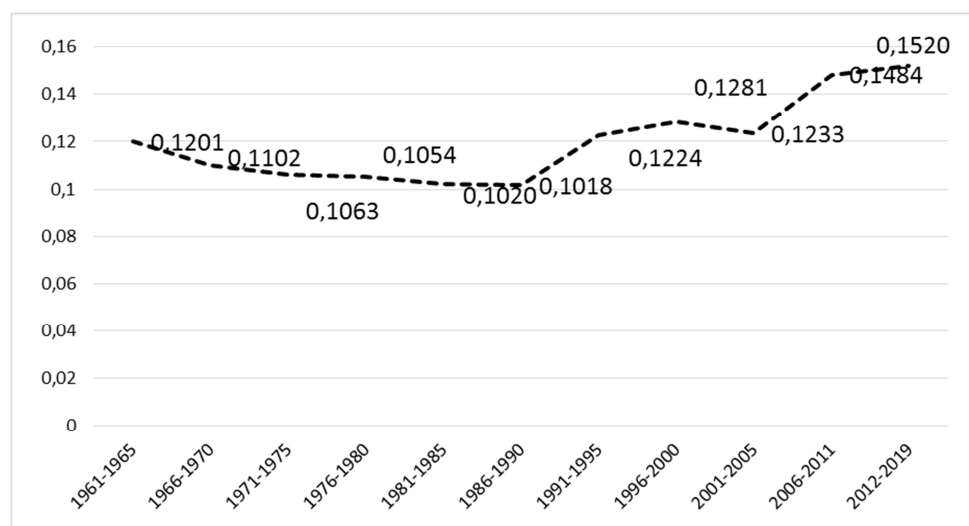
Fig 3. Specialization Rate 1961-2020. Source: Own calculation based on [44].

The main reason for the decline during the 1966-1970 period is the rapid industrialisation in the country. In the first stages of the analysed period, the government policy focuses on overcoming the backwardness after World War II and turning Bulgaria into a developed industrial country.

A number of significant variations and structural changes in all sectors of the economy occurred during the period 1990-2000 [15]. In the pre-accession stage (2001-2005), SR registered the lowest levels for the analysed period (0.61). Similar trends are observed after 2006. They are in parallel with the tendencies in the majority of the EU Member states [29]. In Bulgaria, however, this process is accompanied by issues related to production capacity and polarised agricultural structure.

In the last stage, higher values of the indicator are observed. The main reason is related to the selected base, which considers the share of agriculture in the previous period. The importance of agriculture in Bulgaria, however, is continuing to decrease. In the last two years, the share of agriculture in the GVA is below 4%. The diminishing role of the sector can explain these trends and serious transformation in the Bulgarian economy, dominated by the Tertiary sector [69-70].

Another indicator related to the structural transformations is the Herfindahl index (Figure 4). The coefficient has been used by a number of authors in different variations and modifications [11]. In general, it expresses the sum of the squares of the relative shares of the individual agricultural sectors in the total GVA of agriculture [36]. Due to the lack of detailed information on GVA, the data on gross output is applied. For the purposes of the analysis, the relative shares of the main crops (cereals, industrial crops, fodder crops, fruits and vegetables) and the main livestock products (cattle, pigs, poultry, milk, and eggs, wool) are used in the calculation of the coefficients.



**Fig. 4.** Structural transformations and Herfindahl index. Source: Own calculation based on [42, 44].

Based on the data, it can be concluded that there was no significant variation during the planned economy period (1961-1990). However, there were severe changes during the transition to a market economy.

The highest level of the Herfindahl index is observed in the first analysed stage. In the period 1961-1965, agricultural transformations have just begun, and there is still a dominance of certain subsectors (cereals, fruit, and vegetables) in the structure of the gross agricultural output.

The next stages are related to the relatively balanced development of all agricultural subsectors. Therefore, the values of the index vary insignificantly. During the 1985-1990 period, intensive development of livestock is registered. It forms more than 50% of total agricultural gross output, leading to equalization of the relative production shares.

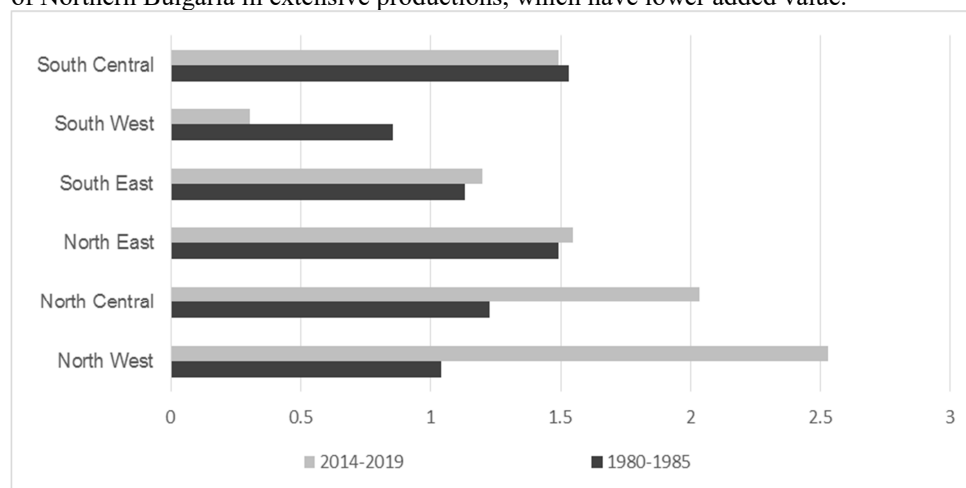
Due to the significant structural reforms after 1990, there has been an increase in the indicator's value. However, there is a decline in production capacity in the majority of the subsectors in this period and numerous issues related to agricultural competitiveness. After a slight decrease in the indicator during the pre-accession period, the index's highest level is recorded in the last stages. The CAP stimulates the development of extensive production, which leads to an increase in their relative shares and a decrease in other intensive

subsectors [55]. Livestock cannot meet the competitive pressure of other EU Member-States. Therefore, cereals and industrial crops are formed as two dominated subsectors, leading to a higher coefficient level. However, this growth is not related to positive changes in agriculture – instead, it shows disparities between individual agricultural productions.

The analysis shows serious imbalances which lead to monocultural agriculture and hinder the sustainable and balanced development of agriculture.

The selected indicators can also be applied on a regional level (Figure 5). SR calculation at the regional level is based on a specific modification of the coefficients. First, two periods of analysis are formed. Second, the country's relative share of the agricultural sector in GVA is used as a base. Thus, values above 1 indicate higher than the national average specialization in the agricultural sector, and levels below 1 are associated with opposite trends.

The results show significant dynamics in the regions. During the first analysed period, in the South-Central region are registered the highest values of the indicator, followed by the North Central and North East region. By contrast, the South West region has registered the lowest results. The intensive productions can explain the leading role of the South-Central region with high value-added, which form the agricultural structure in this area. The regions of Northern Bulgaria, despite their leading role in the share of UAA [2], lag behind South Central. The main reason for this trend is the predominant specialization of regions of Northern Bulgaria in extensive productions, which have lower added value.



**Fig. 5.** Specialization rate, regional level. Source: Own calculation based on [44].

Based on the comparison between the analysed periods, several important trends can be outlined. First, the South-Central region is falling behind Northern Bulgaria. The leading positions of the regions of Northern Bulgaria are linked to the significant growth in the production of cereals, industrial crops, and poultry after the accession to the EU. In the North-West region, the highest level of the index is registered. However, it should be noted that this territory is at the least place in GDP per capita in the EU Member States [16]. In this area, agriculture is the main source of income for the rural population [47].

There is a significant increase in the role of agriculture in the regions of Northern Bulgaria and a decrease in the southern parts of the country. The main reason is related to the issues in intensive production and typical livestock sectors for South Bulgaria.

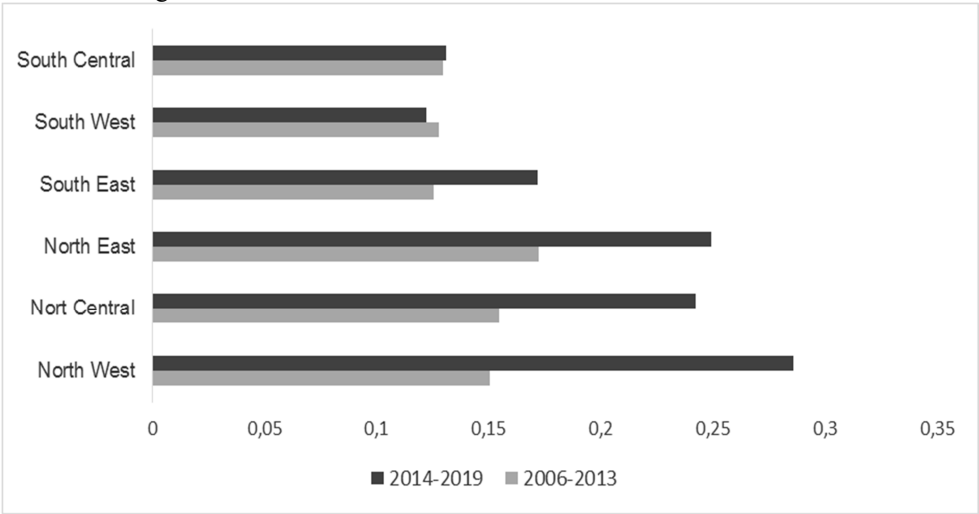
The Herfindahl index is calculated for each planning region divided into two periods, 2006-2013 and 2014-2019, due to the lack of comparable information for 1980-1985 (Figure 6).



The comparison between the regions and periods highlights significant dynamics. In the first analysed period, the highest index level is recorded in the North East region, followed by the other regions of Northern Bulgaria. By contrast, the lowest values of the indicator are registered in Southern Bulgaria. Agriculture does not play a significant role in the South-West region's economy, which explains the observed trends.

These results in the South-Central region are associated with the more equalized relative shares of the agricultural subsectors in the structure of the gross output. The regions in Northern Bulgaria specialize primarily in producing extensive crops and poultry and have a monocultural production structure. On the other hand, in the South-Central region, it is more balanced, with the development of livestock subsectors, vegetables, and fruit production.

In the second period in the North-West region, the highest values of the indicator are observed. This trend is explained by the increased role of cereals and oilseed in agricultural structures and the insignificant relative shares of the other subsectors. In the North-East and North-Central regions, the production structure is also influenced by pig and poultry farming. Therefore, the level of specialization in these territories is lower than that of the North-West region.



**Fig. 6.** Herfindahl index, regional level. Source: Own calculation based on [44].

Two indicators have been used to measure the dynamics of structural differences and transformations in the agricultural sector. The coefficient of structural differences analyses the absolute structural changes. The second additional indicator is the integral coefficient of structural differences. The periods 1980-1985 and 2014-2019 are compared (Table 1).

**Table 1.** Coefficient of structural differences and integral coefficient of structural differences.  
Source: Own calculation based on [44].

Regions	$V_0$	$V_t$	$ v_t - v_0 $	$(v_t - v_0)^2$	$V_0^2$	$V_t^2$
North West	0.1770	0.1211	0.0559	0.0031	0.0313	0.0147
North Central	0.1680	0.1189	0.0491	0.0024	0.0280	0.0141
North East	0.1730	0.1353	0.0377	0.0014	0.0300	0.0183
South East	0.1730	0.1361	0.0369	0.0014	0.0290	0.0185
South West	0.1140	0.3142	0.2002	0.0401	0.0120	0.0987
South Central	0.1950	0.1744	0.0206	0.0004	0.0370	0.0304
Bulgaria	1.0000	1.0000	0.4004	0.0488	0.1673	0.1948

Based on the data the coefficient of structural differences is 0.21, and the integral coefficient of structural differences is 0.36. Significant changes are observed during the analysed period. The role of the agricultural sector in the generated GVA has decreased from 18% to 4% [42]. Despite these transformations, the relative share of the individual regions remains almost unchanged. Only in Southern Bulgaria some variations are outlined. The decline of production capacity and challenges in the vegetables, fruits sector, and the entire livestock sector impact negatively on agricultural development.

The lack of dynamics in the indicators does not correspond to the trends at national and regional levels. The agricultural sector remains polarized and dominated by several significant sub-sectors – cereals and oilseed. The Common Agricultural Policy (CAP) needs to be further transformed in order to contribute to sustainable development and reduce imbalances.

## 4 Conclusions

The analysis of agricultural changes for the last sixty years in Bulgaria, focusing on the period after the country's accession to the EU, shows a significant transformation at structural and sectorial levels. Changes in agricultural production patterns after 2007 have made Bulgaria an exporter of low-value-added products and raw materials, while sub-sectors such as vegetable and fruit production and viticulture lost their competitive advantages. Livestock does not adapt to new conditions and requirements, which leads to a severe decline in meat and milk production.

The implementation of the CAP simulates severe changes in the production and organizational structure of agriculture. The process generates a number of socio-economic consequences that substantially impact the rural regions. Despite financial support under the CAP, the disparities in Bulgaria are still more significant than in the other EU Member States and among different regions in the country and different groups of farms.

All indicators outline the leading position of the North-West planning region and other Northern Bulgaria regions in agricultural specialization, as these parts of the country are producers of extensive crops. On the other hand, they are regions with a lower GDP per capita level than the rest. The decline in vegetable and fruit production and the difficulties and reduced production potential in livestock predetermine the lower level of specialization in the regions where these sectors are predominant. In order to overcome the challenges, the regions of Northern Bulgaria should add value to the produced cereals and oilseed crops. By contrast, in Southern Bulgaria, the traditional vegetable and fruit subsectors should be prioritized.

The imbalances in the agricultural structure in Bulgaria are serious obstacles to sustainable development. Only transformations in economic patterns, social justice, and the environment could ensure the achievement of Sustainable development goals.

A government should coordinate policy-making with different stakeholders (the private sector, citizens, active civil society organizations, and academic circles). A new conceptual framework needs to be implemented in Bulgaria - the local model related to regional specifics can solve some of the challenges, and the role of the bottom-up approaches would be decisive. In this regard, coordination and administrative capacity and the level of social capital and networks should be further developed. In addition, Bulgarian policy measures have to be focused on the specific features of the rural regions, overcoming marginalization and depopulation, and achieving suitable development.

## Acknowledgements

This research work was carried out with the support of Project 597985 EPP-1-2018-1-KZ-EPPKA2-CBHE-JP “New and Innovative Courses for Precision Agriculture” (NICOPA), financed by the Erasmus+ Programme of the European Union.

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