FARMS IN AREAS FACING NATURAL CONSTRAINTS– CHALLENGES AND OPPORTUNITIES

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Abstract

Agriculture and the production of local food and products can have a significant impact on the economic development of viable rural areas. To achieve this, it is mainly small farms that play a key role, especially in areas facing natural constrains (mountainous regions), where their number prevails. Research has shown that in these areas' farms have difficulty in finding suitable conditions for starting new production. This study aims to present the situation of agricultural holdings in areas facing natural constrains (mountainous regions). Also, the opportunities and challenges faced by small farms in these areas to start and carry out agricultural activities. The study uses a generally accepted methodology to determine the viability of rural areas. Based on this, indicators such as land access, lack of marketing skills, administrative burdens and lack of sufficient financial instruments on small farms as major constraints on starting a new economic activity have been studied. The challenges facing local authorities in supporting farms in areas facing natural constrains (mountainous regions) and maintaining viable rural areas are studied.

Keywords: agricultural holdings, less-favoured areas, viable rural areas.

Introduction

In recent decades, there has been some improvement in production and competitiveness in agriculture with the help of specialization, intensification and technological advances. These factors play an essential role in the development of sustainable farms, which in turn maintain viable rural areas through their activities. However, this is not the situation in less-favored (mountainous) areas, where unfavourable economic and infrastructural conditions lead to a progressive decrease in mountain agriculture and depopulation of rural areas. Some authors such as Duglio, Bonadonna, Letey (2022) define as a distinctive feature of agriculture in disadvantaged (mountainous) areas, which is always characterized by its adaptability to the difficult and harsh conditions of mountainous terrain, and for these reasons is also defined as areas of natural constraints (ANCs).

As reported by the European Association of Mountain Regions, mountain agriculture plays an important role in the agriculture sector, representing both 15% of the utilized agricultural area (UAA) and the agricultural workforce in Europe. However, in mountainous areas, labour productivity is 40% lower compared to lowland areas. The Opinion of the Economic and Social Council of the Republic of Bulgaria states that more than 70% of the country's forest reserves are located in mountainous regions and lands, and the majority of the forests are for economic purposes. Almost all protected natural areas (national parks, nature parks, protected natural and historical areas, reserves, etc.) are located in mountainous areas. Most of them fall within the boundaries of NATURA 2000, which include more than 85% of the areas of meadows and over 70% of meadows and pastures.

Typically, agriculture in disadvantaged (mountainous) areas is associated with small-scale agriculture, which is characterised by low levels of production systems (Biala, Terres, Pointereau, Paracchini 2007), but at the same time sometimes produces high-quality food products. According to Rachele (2022), the agricultural workforce, economic production capacity and the size of agricultural land are the elements on the basis of which the dimensions of these production systems are calculated. Small farms in these areas usually offer a wide variety of products and multifunctionality of services, especially related to the tourism sector. They are also considered a means of providing public goods, for the protection of cultural and natural heritage, as indicated by Ricciardi et al. (2021).

In his study, Rachele (2022) points out that small farms cover the majority of the world's 600 million farms, given that about 70% of all farms manage only 7% of the land dedicated to agricultural purposes. In Bulgaria, the results of the 2010 Farm Census show a 54% decline in farms compared to the 2003 census, with their number in 2010 already being 371 100.

The census of agricultural holdings in 2020 maintains the downward trend of small farms, reaching 132,742. However, there is a tendency throughout the country of a large number of small farms concentrated in mountainous areas.

Table 1. Number of farms in mountain areas by economic size

Classes of economic size of farms	Number of farms in mountainous areas with natural constraints	Number of farms in areas other than mountainous areas with natural constraints
Общо	**45 339**	**11 241**
<2000 EUR	21 153	4 810
>=2000&<8000 EUR	14 343	3 064
>=8000 EUR	9 843	3 367

Source: Ministry of Agriculture and Agriculture, Agrostatistics Department, quoted from the dissertation "Economic viability of small farms in mountainous areas, semi-mountainous areas and territories of high nature value.

Despite the significant reduction of small farms in undeveloped (mountainous) areas and the serious challenges they face, they have a great importance and role: for the socio-economic situation and sustainable development of rural areas; to maintain viability in rural areas, especially in mountainous, semi-mountainous and areas with unfavourable conditions, the so-called border regions.

The aim of the study is to analyse the state and trends in the development of agricultural holdings in disadvantaged (mountainous) areas**.** The study assesses the policies implemented at national and local level and how they affect the socio-economic sustainability of rural areas. The main method used in the study is the method for taking into account regional changes. The comparison period is the two years 2010 and 2020.

Research methods

The method of accounting for regional variations is generally accepted in rural studies. It has been applied in the project "Perspectives for Bulgarian Agriculture and Rural Areas in the Context of the Recovery Plan" led by Assoc. Dr. Bozhidar Ivanov, Institute of Agrarian Economics.

The main research tool is a regional factor analysis, which can be applied as a Regional Factors Relocation Analysis (RFSA) and as a Territorial Share Relocation Analysis (TSSA), designed to assess demographic, socio-economic changes between rural and non-rural areas, both at the level of municipalities and at the level of planning regions. Territorial Analysis (TSSA) is an analytical tool

built on the basis of Shift Share Analysis (SSA), designed to determine the contribution of certain components to the observed changes in the studied regional economies (Ivanov 2021). The classical SSA is applied at the level of economic sectors, following the basic principles and logic of this analysis, an analysis of share shifts at the regional level has been developed and proposed, adapting the computational algorithm from RFSA applied by Ivanov (2021). SSA analysis itself is based on a methodology for studying "local displacements" in production (Herzog and Olsen 1977), and the technique was developed and used for the first time as an analytical tool in the early 1960s by Ashby (1970), Dunn (1960). Such analysis is widely used in regional studies, and it reveals taking into account the influence of the national environment, at another intermediate regional or sectoral level, what is the internal, net and independent movement that occurred between the two time points of a given period. Empirical results show that this technique extends the analytical properties of analyses to measure relative change. The analysis of share relocation at regional level includes territorial units – municipalities or types of regions, districts or planning regions and national level.

The Share Move Analysis (SSA) is a convertible tool that can be used to assess regional changes between different regions. The "classical" equation is designed to reveal internal, independent regional displacement by subtracting the influence of the reported context at national level, at the next lower territorial level from an intermediate level. The main elements of the Shift Share Analysis (SSA) computational algorithm are the share displacement in the observed regional object (SS), the national displacement (NS), the intermediate displacement (IS), and hence the internal, net displacement of the area or territorial unit itself (RS) (Herzog and Olsen 1977). The classic computational expression is as follows:

$$SS = NS + IM + RS \quad (1)$$

Equation (1) is also used in the territorial analysis for share relocation, where the internal, net displacement in rural and non-rural area types (RS) is examined, taking into account the pace, direction and context of development in the intermediate regional units (IS) that cover and affect the area types, and calculating the national impact (NS). Thus, RS represents a quantity that equalizes the actual position of the observed indicator of the type of area by extrapolating the rate and vector of change of the indicator under the influence of NS and IS.

The calculation of these elements is done as follows:

$$NS = {}_i local^{t-1} \bullet NS^t / NS^{t-1} \quad (2)$$

$$IS = ({}_i local^{t-1} \bullet {}_i NS^t / {}_i NS^{t-1}) - NS \quad (3)$$

$$RS = {}_i local^{t-1} \bullet ({}_i local^t / {}_i local^{t-1} - {}_i NS^t / {}_i NS^{t-1}) \quad (4)$$

These formulas represent the calculation of the regional change in a specific type (rural, non-rural) area, and another formula close to the one specified (3) is applied in the calculation of the intermediate displacement - IS.

$$\boldsymbol{IS = local^{t-1} * \frac{(IS^t - IS^{t-1})}{(IS^t + IS^{t-1})}} \quad (5)$$

The elements that are included in the analysis are: $_{ilocalt-1}$ – a numerical measure of the local area of a given type at the beginning of the analysis period (t-1), while $_{ilocalt}$ – is the same indicator in the new, compared analysis period (t). Other variables in the equations are NSt, the value of the same indicator but at national level at the end of the analysis period (t), while ISt-1, the intermediate region, which in this case can be a NUTS 3 administrative area or a NUTS 2 planning area, at the beginning of the analysis period (t-1), and ISt, the value of the indicator in the intermediate region at the end of the analysis period (t). In this case, RS is a quantity with the same units of measurement as the indicator, and can take negative and positive values that equalize the difference between localt, NS and IS. Since IS also is a function of NS, its calculation can be done by equation (3), (5), but it can also be obtained in the following way:

$$\boldsymbol{IS = local^{t-1} \frac{IS^t}{IS^{t-1}} - IS^{t-1} * \frac{NS^t}{NS^{t-1}}} \quad (6)$$

This way of calculating the IS is relevant, but the reason for choosing the application of equation (5) is that it also takes into account that the effect of the IS must take into account the cumulative effect on the IS of the NS of which it is also a part (IS NS). Therefore, in equation (15), the assumptions are that the IS does not proportionally affect the observed indicator local$\in^{t-1}$ and its impact strength is limited, because of the need to take into account the accumulated influence of the NS. At the same time, RS can be expressed as a coefficient not only as an absolute, but also as a nominal value for the indicator. The RS coefficient is normalized in the range from 0 to 1, because in the primary calculation of formulas, it varies due to the units of measurement of the observed indicator, which makes it difficult to interpret the analysis. This coefficient not only normalizes RS nominal values based on the deviation between RS and localt. Normalization is carried out as follows:

$$\boldsymbol{RSDEV = \frac{RS^t}{local^t}} \quad (7)$$

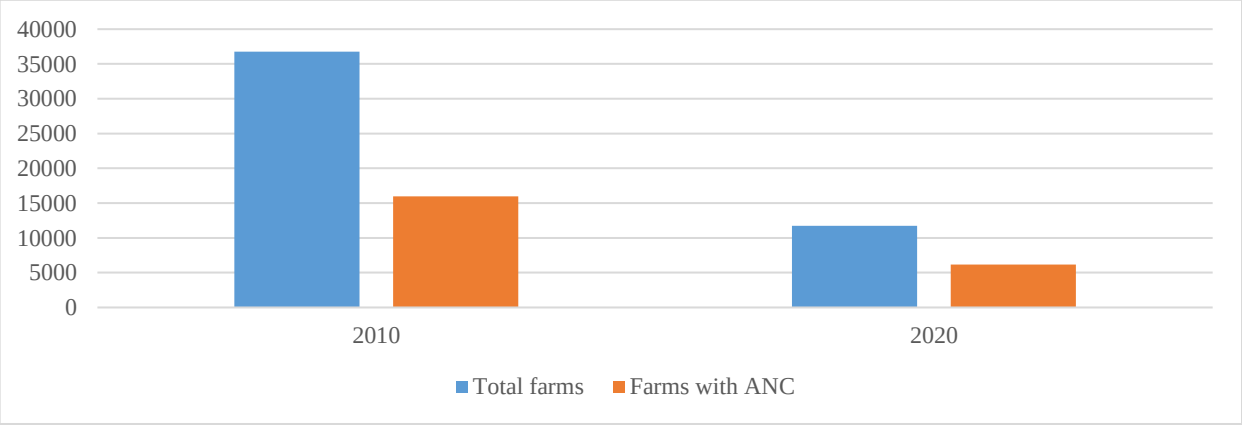
$$\mathbf{RS}\ \boldsymbol{coef._{AD}} = \mathbf{0,5 + 0,5 * RSDEV / \left\lfloor \frac{RSDEV_{min} + RSDEV_{max}}{2} \right\rfloor} \quad (8)$$

The application of equation (8) is made when there is a number of observed units, which makes sense of the derivation of such a normalized coefficient. It obtains values from 0 to 1, and when RS CoefAD is closer to 1 than the greater deviation of RS for the specific region exceeds localt and the average for the population of the minimum and maximum deviation ($\mathbf{RSDEV_{Max}}$ $\mathbf{RSDEV_{Min}}$). It is accepted if the RSCoefAD is negative below 0 and is normalized if it exceeds 0 to 1. RSCoefAD is a regional displacement factor showing not the nominal value of RS but its relative value compared to the actual value in the compared period of the indicator and allows all units included in the survey to gain equal weight by mapping RS to localt, allowing them to be compared.

Results of the analysis

The results of the calculations take into account the actual change of selected indicators in the disadvantaged areas, taking into account the influence of the regional regions at the municipal level (IS), at the national level (NS) and the effect of the regional change (RS). The actual change in the number of agricultural holdings in the disadvantaged areas, comparing the two years 2010 and 2020 After the calculations made, following the adopted methodology, the following results were obtained for the period 2020 compared to 2010.

Figure 1. Actual change in the coefficient at national and regional level of the number of farms by disadvantaged areas for 2010 compared to 2020



Source: Agrostatistics Department, Ministry of Agriculture and Agriculture.

This change is explained in a number of circumstances related to migration processes – the movement of the population to the cities in order to find sources of livelihood. Deteriorating infrastructure in disadvantaged areas (lack of road infrastructure, telecommunications and internet access) greatly increases the outflow from agriculture. Also, the lack of access to social services such as healthcare, education and leisure activities expresses the unattractiveness of disadvantaged areas among the country's young population.

The second part analyses the effect of the regional change (RS) of the indicator for the number of agricultural holdings in less-favoured areas compared to the change in the number of agricultural holdings on average for the country.

Regional Shift-Share component: Farm Number Ratio focuses on the change in the coefficient in less-favoured areas (Table 2).

Table 2. Regional Shift-Share component: Coefficient of change in the number of farms in the disadvantaged areas compared to the national

RS		RS coefficient		RS Absolute Value Ratio	
Average for the country	**Average for ANC**	**Average for the country**	**Average for ANC**	**Average for the country**	**Average for ANC**
-27	-24	750	390	0.42	0.21

Source: Classification by disadvantaged areas – number of farms (2020), own calculations.

Discussion

In the study, the main focus is placed on agriculture and farms in the disadvantaged regions of Bulgaria, which is extremely important due to the following two factors. Firstly, structural changes in farms are

intensifying in mountainous areas, as many farms are very small and not competitive enough. Thus, these farms often source a greater proportion of household income from off-farm sources and limited labour availability, making them vulnerable to changes in support policies. Secondly, mountainous areas have great potential to provide ecosystem goods and services of high societal importance (Grêt-Regamey et all 2012). Mountain agriculture provides, together with food production, a range of important goods and services such as landscape maintenance, biodiversity conservation and contributes to the vitality of rural areas. Therefore, it is necessary to create targeted measures and activities with a focus on regional policies aimed at maintaining agricultural production in mountain regions by creating more competitive structures, as well as on supporting goods and services produced in mountain ecosystems.

In particular, the necessary measures should be taken to create conditions to facilitate the availability of off-farm employment in order to stop the increasing depopulation and improve the socio-economic situation of these areas.

Conclusion

The study analyses farms in disadvantaged areas, which face a number of difficulties and constraints that they have to face in starting and maintaining business activities over time. If, on the one hand, land fragmentation/availability and financial overexposure are the main reasons for limiting mountain farming, on the other hand, networking with local communities and specialised tools such as quality/origin labels can play an important role in maintaining new farmers.

The analysis carried out aims first of all to provide guidance to local regional authorities on the main actions that, on the one hand, will affect the growth of agricultural holdings in disadvantaged areas and, on the other hand, to create favourable conditions for supporting new farmers in starting and developing economic activity in mountain areas.

Based on the coefficients obtained by the method of regional amendment, it can be concluded that the intentions for growth of farms are mainly influenced by structural characteristics such as a relative change in the size of the farm, the income received from agriculture.

Attention should be paid to providing more sources and a greater amount of public support to enable farms in disadvantaged areas to achieve good results such as increasing their economic potential, improving their working environment and qualifications, access to markets, which in turn will lead to an increase in their viability and sustainability.

Implementing and creating measures to improve the social environment and infrastructure according to the needs in disadvantaged areas will significantly improve living conditions in rural areas.

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