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**АНАЛИЗ НА ПРОДУКТИВНОСТТА И ЕФЕКТИВНОСТТА НА
ЗЕМЕДЕЛСКИТЕ СТОПАНСТВА В РЕГИОНАЛЕН АСПЕКТ
ANALYSIS OF PRODUCTIVITY AND EFFICIENCY
OF AGRICULTURAL FARMS REGIONALLY**

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Abstract

In terms of the actual membership of Bulgaria in the EU, a number of changes in the structure and organization of the farms is observed, causing changes in their productivity and efficiency.

The purpose of this article is to make a comparative analysis of productivity and efficiency in different size, status and ownership of farms, assessing the opportunities for future improvement.

The study covers the period between 2007–2012. The research is based on data from the National Statistical Institute, Bulletins of the Agricultural Statistics department of MAF, direct contacts, completing of specifically developed for the purpose of analysis reports, spreadsheets, business documents and more. To specify the data and information the method of interview is applied.

Key words: productivity, efficiency, agricultural farms, Bulgaria

INTRODUCTION

Socio-economic changes during the recent decades in Bulgaria have had a significant influence on the status and development of agriculture. As a consequence to the restoration of land ownership, the business structure of the agricultural unions was radically changed. Despite some stability in the macroeconomic environment, the productivity and efficiency of these farms are far below their potential.

After 2007, under the conditions of actual membership of Bulgaria in the European Union /EU/, the modifications in the structure and organization of the farms continues. There is a trend towards concentration and consolidation of land farms, which is reflected in the number of employees. These processes directly affect the output of the different types of farms, as well as their production and economic efficiency.

The purpose of this article is to make a comparative analysis of the productivity and efficiency in different in size, status and ownership farms, and to evaluate the possibilities for future development.

MATERIALS AND METHODS

While analyzing the productivity, the following factors were studied: "arable land" and "agricultural labor" in different in size, status and ownership farms. The productivity of the land is determined by the amount of output produced per unit of area. It is calculated as the quotient between the volume of production and the size of the cultivated land. This index is known as an indicator of the average yield per unit area. The productivity of the agricultural labor is the relationship between the volume of production and the consumed labor, measured in man-hours.

The production and economic efficiency is measured by the level of profit made by the farms. In the present study, the efficiency of the farm types is calculated with the formula:

$$\Delta P \equiv PFT - \sum_{i=1}^n P_i$$

Where: PFT is the profit on farm types ;
 P_i - the profit of the i-th farm ; i = 1,2,3, ..., n.
 If ΔP > 0, farms of this type provide economic profit.

The research on the productivity and efficiency covers 178 farms located in the South Central region /SCR/ where in 2007 /at the onset of the study/ farms were 133 569 from 481 920 ones in total for the country /27.72%/ (Agricultural reports, 2007).

For the purposes of the analysis, the farms studied are grouped according to their business structure. The following types of organizational structures were examined:

Individuals – these include specific organizational units that combine the characteristics of the family business and the characteristics of agricultural production. Their share in the total surveyed farms was 34%.

Sole proprietors – /SP/ (16%) - These are mostly small farms of semi-market type. A major part of their production is for local markets.

Capital companies - These include a Single member limited liability – One-man Limited Company /Ltd./ that are 21% of the total surveyed companies and Limited liability Company /LLC/ whose share is 22%.

Farmer Unions and cooperatives (7%) - These are entities whose production is primarily aimed at meeting the needs of their employee-members.

The analysis of the scope of the studied farms by type is characterized by the minimum and maximum values of a group of parameters. These include the total cultivated area, the produce of it, the number of the management staff and the workers, as well as the profit of the agricultural farms for the period (Table 1).

Table 1. Characteristics of surveyed farms

Types farms Indicators	Individuals		SP		Ltd.		LLC		Farmer Unions and cooperatives	
	min	max	min	max	min	max	min	max	min	max
Cultivated area /da	0,5	680	4	6000	10	19912	10	50098	29	16800
Production / kg	190	333200	12500	2842560	13000	7196028	11850	24047040	23200	13739810
Total employed in farm / pc.	1	14	3	75	3	156	4	164	4	54
Production / BGN	98	320	196	610	235	811	243	906	84	463
Realized profit / BGN	-138	264	-65	391	-52	694	-49	831	-241	293

Data from their own research

The study covers the period from 2007 to 2012. The data and information were collected through direct contacts, filling specifically developed for the purpose of analysis reports, spreadsheets, company documents and more. The statistical package SPSS 13.0 was used for processing and data analysis.

RESULTS AND DISCUSSION

Under the conditions of the actual membership of Bulgaria in the EU, a priority in the development of the agricultural sector is the combination between the Common Agricultural Policy /CAP/ and the National Agricultural Policy. This results in several changes in the structure and organization of the farm. There is a trend towards concentration and consolidation of land unions. (Bencheva, 2012; Tepavicharova, 2012)

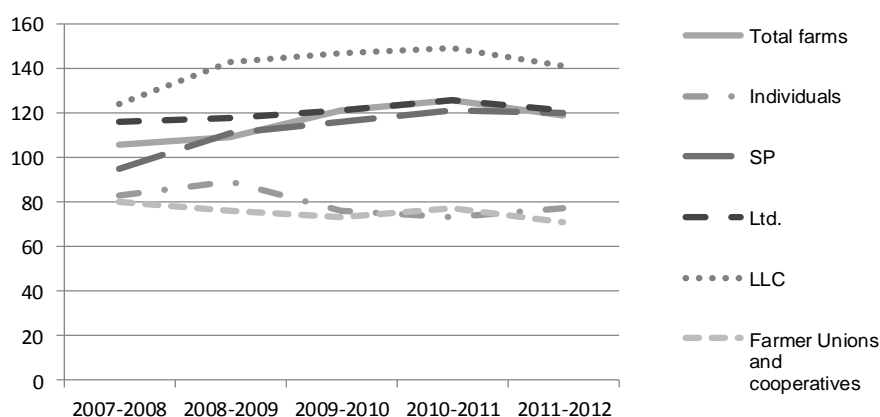
According to the research for the period between 2007 and 2012, the total area of cultivated land in the surveyed farms increased by over 7% (Table 2). The greatest consolidation of farms is observed in Sole Proprietors (SP). During the study period, the arable land in them grew by over 50%. Similar is the data for the Capital companies. The main reason for this is the effect of the implementation of the Common Agricultural Policy /CAP/ in the "Direct Payments" part. The opposite tendency is observed in the farms of Individuals, where cultivated land has been decreased by over 21%. Even more negative are the results of the unions and cooperatives. The cultivated acres in them fell by more than 56%.

Table 2 . Arable land in acres in different farm types according to their structure – averages

Types farms Years	Total	Individuals	SP	Ltd.	LLC	Farmer Unions and cooperatives
2007 – 2008	5965	98	1761	6934	12054	3980
2008 – 2009	5306	94	1603	7761	14963	2108
2009 – 2010	5783	151	1811	9368	15307	2279
2010 – 2011	5694	84	2690	8385	15698	1613
2011 – 2012	6423	77	2729	9980	17603	1724
Change 2012/2007 %	7,67	-21,42	54,97	43,93	46,03	-56,68

Data from their own research

Similar polarization in the farm types was observed with respect to the productivity of the agricultural land /Figure 1/. For the period 2007-2012, companies of SP type and Capital companies show stable positive productivity.



Data from their own research

Figure 1. Productivity of the land* in farm types according to their structure for the period 2007–2012

*the productivity is calculated in % on the average productivity of all farms for the five years of the study. (the average productivity is 1314.72 BGN. / da = 100 %)

Particularly high results are seen in Limited liability companies in which the Individuals, Unions and cooperatives demonstrate a very low productivity throughout the study period. This is largely due to the small size of the organizations, the low level of mechanization and bad practices in land management.

Similar polarization in the farm types was observed with respect to the productivity of the agricultural land /Figure 1/. For the period 2007-2012, companies of SP type and Capital companies show stable positive productivity. Particularly high results are seen in Limited liability companies in which the productivity of the land exceeds the average by more than 50%. In contrast, Individuals, Unions and cooperatives demonstrate a very low productivity throughout the study period. This is largely due to the small size of the organizations, the low level of mechanization and bad practices in land management.

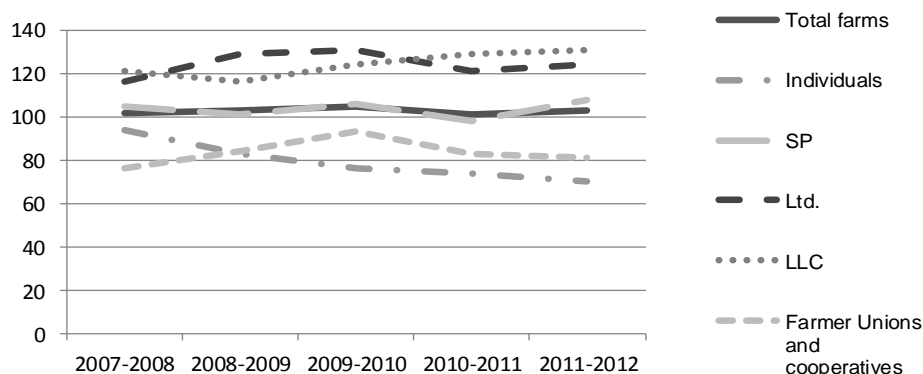
The increase of productivity and the achieving of high production and economic performance requires analysis of the impact of the labor force on farms, too. The survey shows that for the period 2007-2012, there is a tendency toward reduction of the total number of employees in almost all researched farms /Table 3/. Exception are the Limited liability companies in which there is a slight increase in the number of employees. The negative trend of decreasing employment can be regarded as a consequence of the reforms made in agriculture and the impact of the economic crisis. The introduction of the Single Payment Scheme (SAPS) is a direct cause of land consolidation into larger farms and the reduction of those of semi-market type. This limits the capacity of the farm to provide employment opportunities, especially for low-educated individuals.

Table 3. Total number of employed by farm types according to their business structure – averages

Types farms \ Years	Total	Individuals	SP	Ltd.	LLC	Farmer Unions and cooperatives
2007 – 2008	18,64	4,83	7,88	24,39	36,98	19,12
2008 – 2009	18,72	4,68	8,06	26,11	37,53	17,21
2009 – 2010	18,53	3,85	9,31	23,06	38,11	18,34
2010 – 2011	17,12	3,39	8,61	18,57	38,88	16,09
2011 – 2012	17,48	4,06	7,03	19,31	39,76	17,24
Change 2012/2007 %	-6,22	-15,94	-10,79	-20,83	7,52	-9,83

Data from their own research

In certain organizations, reducing the total number of employees is due to the increased productivity of agricultural labor. /Figure 2/. These are mainly capital companies, where there are observed trends of modernization of production conditions, the introduction of innovative technologies and new plant varieties, as well as new forms of organization of production and labor. The innovations in these areas are a prerequisite for achieving better production and financial performance, and increasing the productivity of labor.



Data from their own research

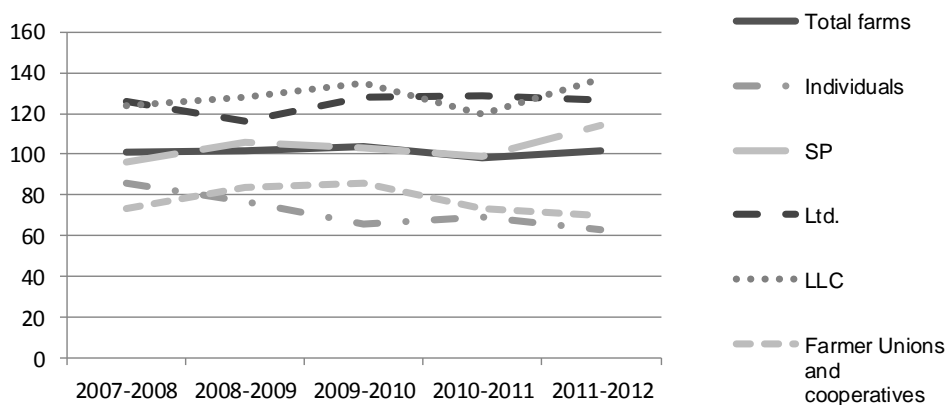
Figure 2. Labour productivity* in farm types according to their business structure for the period 2007–2012

*the productivity is calculated in % on the average productivity of all farms for the five years of the study. (Average productivity is 134,51 BGN per man-day = 100 %)

As for the Individuals and the Unions and cooperatives, the labor productivity observed is only about 70% - 80 % of the average for the surveyed farms. Delays in restructuring these organizations impedes their adaptation to market principles and requirements of the CAP. This leads mainly to a lack of investment in agricultural machinery and equipment, which requires increased use of manual labor, and thus lowering the productivity of labor.

For the proper functioning of any organization, an important role is played by improving production efficiency, which is directly reflected in the final economic results. In this regard, in this study the profit is to be seen as the general indicator value expressing the degree to which the production and economic efficiency of the farms is achieved.

The analysis of the data indicates that for the period 2007-2012, the effectiveness of the total surveyed farms remained relatively constant at around average profit. (The estimated average profit of all farms in the five years of the study is 315.17 BGN / da = 100 %). /Figure 3/ Similar results are shown in the Sole Proprietors type. The higher productivity of land and labor in the Capital companies has a strong positive impact on their effectiveness. High end produce and economic results are reported for the Limited liability companies. Their performance for the last year of the study is nearly 40% higher than the average. High efficiency is achieved by Ltd., too.



Data from their own research

Figure 3. Efficiency of the farms* by type of economic structure for the period 2007-2012*
 *the performance is calculated in % on the average profit of all farms in the five years of the study. (Average profit 315.17 BGN / da = 100 %)

Contrasting results are demonstrated by Individuals and unions and cooperatives. The achieved production and economic efficiency in the period of the study was only 60 % to 80 % of the average for the surveyed farms. Undersized plots of land make it difficult to apply for direct payments because they do not meet the requirement of a plot of land measuring more than 0.5 hectares. These farms can not rely on the measures from the Rural Development Programme /RDP/, since there exist limiting conditions - candidates to be larger than 1 ESU in which category do not enter a large number of farms. This severely restricts the possibilities for organizing of a modern production with the application of modern technologies for growing crops. In this regard, it is necessary for the processes of consolidation of agricultural land to continue, stimulating the restructuring of the semi-market farms into market types.

A good opportunity to overcome the negative consequences of the farms of Individual type is the application of modern forms of integration and unions of farmers. As an alternative to increasing the efficiency of production, the establishing of regional agro-clusters may be indicated. (Bencheva, 2011). The agro-cluster promotes the integration of small farmers on the basis of cooperation, the optimization of the amount of arable land and its rational use, as well as the optimal use of human resources in the farms.

CONCLUSIONS

The practical adaptation of the agricultural sector to the CAP of EU, results in modifications in the structure and organization of the farms. Their development is related to the current processes of concentration and consolidation of production, observed predominantly in the Capital companies and the farms of Sole proprietors. It results in modernization of the production conditions, the introduction of innovative technologies and new plant varieties, as well as contemporary forms of organization of production and labor. Innovation in these areas is a prerequisite for achieving better production and financial performance, together with increase in the productivity of the cultivated land and agricultural labor.

At the farms of Individuals and Unions and cooperatives, a considerably lowered productivity and efficiency is observed. This is largely due to the small size of the farms, the low level of mechanization and bad practices in land management. Undersized plots hamper the organization of modern production with the application of modern technologies for growing crops. In this regard, it is necessary for the processes of consolidation of the agricultural land to continue, thus stimulating the restructuring of the semi-market farms into market ones .

A beneficial opportunity to overcome the negative consequences at these farms is the application of modern forms of integration and unions of farmers. As an alternative to increasing the efficiency of production, the establishing of regional agro-clusters may be indicated.

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