Assessment of the competitiveness of agricultural holdings in Bulgaria

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Summary

The problem of determining the competitiveness of various economic organizations is among the most topical academic and practical issues from the emergence of economics science to the present day. It is particularly important for the agricultural sector, which is characterized by many participants, high specialization and exchange, strong competition at local, national and international level, highly integrated food and supply chains, market segmentation, unequal public support, strong state regulation, processing and trade and professional organizations, strong consumer pressure for quality, eco-behavior, etc., presence of underdeveloped and non-competitive "markets", etc. Nevertheless, despite its importance and continouing debates, there is still no consensus on what is the competitiveness of farms, how to measure the competitiveness of different organizations in agriculture, what is the absolute and comparative competitiveness of different types of farms, which are the critical factors for increasing the competitiveness at the current stage of development, etc. This paper tries to fill the existing gap by applying a holistic approach and assessing the competitiveness of Bulgarian farms as a whole and with different specializations. The multi-criteria assessment found that the level of competitiveness of farms in the country is at a good level, with low adaptive potential and economic efficiency to the greatest extent contributing to lower competitiveness. More than a third of all agricultural holdings have a low level of competitiveness. The most competitive are the farms specialised in the beekeeping, followed by field crops, mixed animal husbandry and mixed crops production, and the lowest for farms in grazing livestock. Most significant factors for increasing the competitiveness of Bulgarian farms are market conditions (supply and demand, prices, competition), direct government subsidies, access to knowledge, advice and counseling, participation in government support programs, available information , financial opportunities, and opportunities for benefits in the near future. Proposed approach should be improved and applied more widely and periodically, increasing accuracy and representativeness. The latter requires close cooperation with producer organizations, advisory service and other stakeholders, and improvement of the agricultural information collection system in the country.

Key words: competitiveness, agricultural holdings, specialization, Bulgaria

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Introduction

The problem of determining the competitiveness of various economic organizations is among the most topical academic and practical (aimed at improving business strategies and policies) issues from the emergence of economics science to the present day (Falciola and Rollo, 2020; Dresch et al., 2018; Westeren, et al., 2020; Wisenthige and Guoping, 2016). It is particularly important for the agricultural sector, which is characterized by many participants (including foreign ones), high specialization and exchange, strong competition at local, national and international level, and highly integrated food and supply chains. Moreover, this sector has a number of specifics such as the dominance of small property and informal management, the existence of quasi-monopoly situations in supply and sales, strong dependence on natural conditions, unequal public support, market segmentation, strong state regulation, processing and trade chains, professional organizations, etc., strong consumer pressure for quality, eco-behavior, etc., presence of underdeveloped and non-competitive "markets", needs for new approaches, etc.

The problem of competitiveness has become particularly relevant in recent decades as a result of the fundamental development of the Theory of Economic Organizations (Bachev, 2012; Porter, 1980; Williamsom, 1996), the processes of globalization and competition and the new social and market "order" defined from international agreements and institutions (World Trade Organization, World Bank, International Monetary Fund, European Union, etc.) (EC; FAO; OECD). The latest processes such as the COVID-19 pandemic, climate change, fundamental reform and greening of the Common Agricultural Policy (CAP) of the European Union (EU), widespread digitalisation, etc. pose new challenges to the competitiveness of agricultural producers in the country and around the world.

Despite its importance and long-term lively discussions, there is still no consensus on: what is the competitiveness of agricultural holdings, how to measure the competitiveness of different organizations in agriculture, what is the absolute and comparative competitiveness of different types of agricultural farms, which are critical factors for increasing the competitiveness at the current stage of development, etc. Addressing all these issues is not just an important research issue, but a question of concern to farm managers and owners, professional and non-governmental organizations, politicians and the general public. It is no coincidence that increasing the viability and competitiveness of the sectors and agricultural producers has again been identified as one of the strategic objectives of the EU CAP in the new programming period 2021-2027. (EU, 2018).

Numerous studies have emerged in recent years on various aspects of the competitiveness of farms of different (mostly small) sizes (Alam et al., 2020; Berti and Mulligan, 2016; Latruffe, 2010, 2013; Lundy, et al., 2010; Mmari, 2015; Ngenoh et al., 2019; Orłowska, 2019), in selected countries (Alam et al., 2020; Benson, 2007; Jansik and Irz, 2015; Hadley, 2006; Popovic, Knezevic and Tosin, 2009 ; Kleinhanss, 2020; Krisciukaitiene, Melnikiene, and Galnaityte, 2020; Nivievskyi, et al., 2011; Nowak, 2016; Mykhailova et al., 2018; Orłowska, 2019; Ziętara and Adamski, 2018), subsectors (Alam et al. , 2020; Benson, 2007; FAO, 2010; Jansik and Irz, 2015; Kleinhanss, 2020; Marques et al., 2011; Marques, 2015; Nivievskyi, et al., 2011; Ngenoh et al., 2019; Oktariani, Daryanto, and Fahmi, 2016; Ziętara and Adamski, 2018), farming systems, such as organic, vertically integrated, greenhouse, etc. (Marques, 2015; Orłowska, 2019), regions (Marques et al., 2011; Nowak, 2016) and chain producers (Lundy, et al., 2010; Ngenoh et al., 2019), comparative studies in different EU countries (FAO,

2010; Jansik and Irz, 2015; Nowak and Krukowski, 2019; Ziętara and Adamski, 2018), and technological, institutional and organizational factors for improving farm competitiveness (Berti and Mulligan, 2016; Mmari, 2015; Ngenoh et al., 2019; Oktariani, Daryanto, and Fahmi, 2016; OECD, 2011), etc.

To date, however, there is no widely accepted and comprehensive framework for understanding and assessing the competitiveness of farms in different market, economic, institutional and natural environments. Usually the competitiveness of agricultural holdings is not well defined and is assessed through traditional indicators of technical efficiency, productivity, profitability, etc. Rarely is a systematic approach applied to the formulation of pillars and the principles of competitiveness, to the criteria and indicators of evaluation at its level, to the integration and interpretation of assessments, etc. Moreover, important aspects of farm competitiveness such as management efficiency, potential and incentives for adaptation, and 'long-term' sustainability are often completely ignored in the analyzes.

In Bulgaria, modern research on the absolute and comparative competitiveness of agricultural holdings is at the beginning stage (Andonov, 2013; Alexiev, 2012; Borisov, 2007; Bashev, 2010, 2011, 2017; Ivanov et al., 2020; Koteva and Bashev, 2010, 2021; Koteva, 2016; Koteva et al., 2018; Slavova et al., 2011; Bachev, 2010). The number of publications on the level of competitiveness of agricultural holdings at the stage of EU CAP implementation is insignificant. In addition, there are practically no comprehensive studies on the competitiveness of farms with different product specialization at the current stage of development of the sector. This deters both for farms management and the improvement of public support policies for farmers of different kinds.

This study tries to fill the existing gap by applying a holistic approach and assessing the competitiveness of farms as a whole and with different specializations in Bulgaria.

Research methodology

Competitiveness means the capability (internal ability, potential, incentives) of the agricultural holding to maintain sustainable competitive positions on (certain) market(s), leading to high economic performance through continuous improvement and adaptation to changing market, natural and institutional environment (Bachev, 2010; Koteva and Bachev, 2010). The level of competitiveness is always specific to a particular market-oriented farm in relation to the markets in which it sells its products and services.

Efficiency, financial emdowment, adaptability and sustainability are the main “pillars" of the competitiveness of agricultural holdings. Good competitiveness means that a farm (1) produces and sells its products and services efficiently on the market, (2) manages its financing efficiently (3) is adaptable to the evolving market, institutional and natural environment, and (4) is sustainable in time (Bachev, 2010; Koteva and Bashev, 2010). Conversely, insufficient (lack of) competitiveness indicates that the farm has serious problems in efficient financing, production and sale of products due to high production and/or transaction costs, inability to adapt to evolving environmental conditions and/or insufficient sustainability over time.

For assessing the particular and integral level of competitiveness of Bulgarian farms, a holistic approach is applied, which includes a system of 4 criteria and 17 indicators and reference values, taking into account economic efficiency, financial capabilities, adaptation potential and the level of sustainability of farms (Table 1). The choice of appropriate reference values is particularly important for an adequate assessment of the level of competitiveness. For example, a significant overpassing of the sectoral productivity and profitability is a sign of (higher) efficiency and competitiveness of farms; lack of "sufficient" liquidity - for small financial capability and low (non)competitiveness; the serious problems of marketing the production and the lack of an heir willing to take over the farm - for low sustainability and competitiveness, etc.

Table 1. Criteia and Indicators for Assessing Competitivness of Bulgarian Farms

Criteria	Indicators	
	Particular	**Integral**
Economic efficiency	Labor productivity	Index of Economic Efficiency
	Land and livestock productivity	
	Income per utilized of land and livestock	
	Profitability of farm	
Financial endowment	Profitability of own capital	Index of Financial Endowment
	Liquidity	
	Level of Financial autonomy	
Adaptability	Level of Adaptability to natural environment	Index of Adaptability
	Level of Adaptability to market environment	
	Level of Adaptability to institutional environment	
Sustainability	Level of Sustainability in supply of land and natural resources	Index of Sustainability
	Level of sustainability in supply of labor	
	Level of Sustainability in inputs supply	
	Level of Sustainability in supply with innovation and know-how	
	Level of Sustainability in funding	
	Level of Sustainability in supply with services	
	Level of Sustainability in utilization and marketing of produce s and services	
		Index of Competitivness

Source: authors

A detailed presentation of the applied holistic approach, and the criteria for selection and integration of indicators for assessing the competitiveness of farms in Bulgaria is presented by Bachev (2010) and Koteva and Bachev (2010; 2021).

There is a lack of adequate (statistical and other) information in the country for assessing the various aspects of competitiveness of agricultural farms. In this study, the assessment of

the level of competitiveness of farms is based on primary (survey) micro information provided in the summer of 2020 by the managers of 319 "typical" farms[2] of different types, production specializations and geographical locations. The structure of the surveyed farms approximately corresponds to the real structure of the farms in the country and in the main sub-sectors of the agricultural production in Bulgaria.

A summary of the surveyed holdings and their managers (owners) is presented in Table 2 and Table 3.

Farm managers are given the opportunity to indicate one of the three levels (low, good, high), which most closely corresponds to the condition of their holding for each indicator of the four competitiveness criteria. The qualitative assessments of the managers were transformed into quantitative values, as the high levels were assessed with 1, the intermediate with 0.5, and the low with 0.

For each of the agricultural holdings, an integral competitiveness index is calculated for the individual criteria and as a whole, as an arithmetic avarages. The competitiveness indices of farms with different types of specialization were obtained as arithmetic avarage from the individual indices of the constituent holdings. To determine the overall level of competitiveness, the following banchmarks were used, set up by leading experts in the field: high level 0.51-1, good level 0.34-0.5 and low level 0-0.32.

[2] The authors are grateful to the National Agricultural Advisory Service for their assistance and to all managers of the surveyed farms - for the information provided.

Table 2. General characteristics of surveyed agricultural holdings in Bulgaria

Characteristic	Field crops	Vegetables, flowers and mushrooms	Permanent crops	Grazing livestock	Pigs, poultry and rabbits	Mix crops	Mix livestock	Mix crop-livestcok	Beekeeping	Share in total
Physical person	73.91	96.67	97.40	93.75	100.00	93.33	100.00	94.55	88.89	94.30
Sole trader	8.70	3.33	0.00	3.13	0.00	4.44	0.00	1.82	0.00	2.22
Cooperative	8.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63
Company	8.70	0.00	2.60	3.13	0.00	0.00	0.00	1.82	11.11	2.22
Association	0.00	0.00	0.00	0.00	0.00	2.22	0.00	1.82	0.00	0.63
Mostly for self-sufficiency	8.33	3.33	5.33	9.68	6.67	6.98	11.76	5.66	11.11	6.49
Small for the sector	41.67	70.00	66.67	67.74	93.33	62.79	29.41	66.04	22.22	61.69
Average for the sector	45.83	26.67	26.67	22.58	0.00	27.91	58.82	26.42	55.56	29.87
Big for the sector	4.17	0.00	1.33	0.00	0.00	2.33	0.00	1.89	11.11	1.95
Plain region	75.00	83.33	60.26	50.00	56.25	46.67	44.44	55.36	44.44	58.31
Mountain and semi-mountain region	12.50	6.67	25.64	28.13	25.00	26.67	27.78	21.43	11.11	21.94
With lands in protected areas and territories	0.00	3.33	6.41	12.50	6.25	6.67	11.11	12.50	22.22	7.84
Mountain region with natural restrictions	20.83	3.33	12.82	15.63	18.75	22.22	16.67	26.79	33.33	18.18
Non-mountainous regio with natural restrictions	0.00	6.67	3.85	12.50	0.00	8.89	11.11	5.36	11.11	5.96
Share in total	7.55	12.58	24.53	10.06	5.03	14.15	5.66	17.61	2.83	319

Source: Survey with agricultural producers, 2020

Table 3. General characteristics of surveyed managers of agricultural holdings in Bulgaria

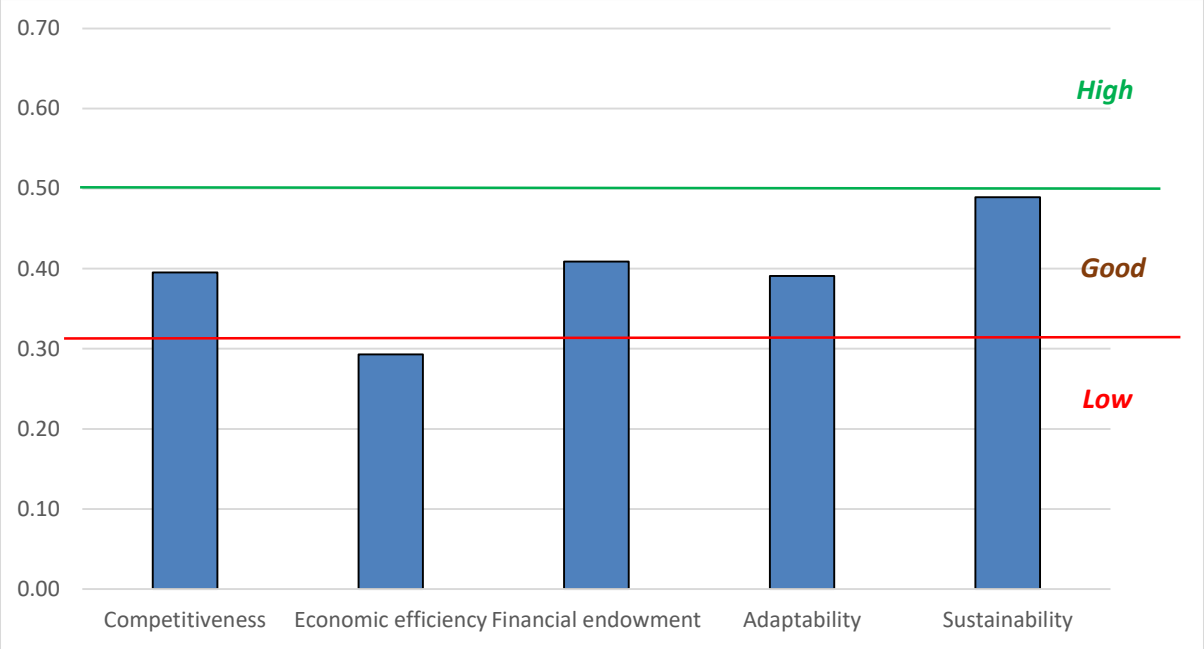
Characteristic	Field crops	Vegetables, flowers and mushrooms	Permanent crops	Grazing livestock	Pigs, poultry and rabbits	Mix crops	Mix livestock	Mix crop-livestcok	Beekeeping	Share in total
Man	62.50	39.29	59.46	68.75	53.33	63.04	72.22	50	78.18	62.62
Woman	29.17	60.71	39.19	31.25	46.67	28.26	22.22	40.00	21.82	34.50
Partnership	0.00	0.00	1.35	0.00	0.00	8.70	5.56	10.00	0.00	2.24
Group property	8.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64
Young farmer (up to 40 years)	0.00	66.67	57.97	55.56	53.33	35.90	53.33	50.00	31.48	46.26
Age from 41 to 55 years	56.25	18.52	23.19	33.33	33.33	48.72	20.00	25.00	46.30	34.52
Age from 56 to 65 years	37.50	11.11	10.14	3.70	6.67	12.82	26.67	25.00	18.52	13.88
Over 65 years	6.25	3.70	8.70	7.41	6.67	2.56	0.00	0.00	3.70	5.34
Basic education	16.67	0.00	6.41	18.75	0.00	6.67	16.67	0	7.14	7.86
Secondary agricultural	4.17	13.79	6.41	3.13	6.25	15.56	0.00	0.00	1.79	6.60
Secondary comprehensive	41.67	48.28	42.31	59.38	62.50	46.67	27.78	11.11	58.93	48.43
Univercity agricultural	16.67	13.79	11.54	9.38	6.25	4.44	11.11	11.11	7.14	9.75
Another univercity	20.83	24.14	33.33	9.38	25.00	26.67	44.44	77.78	25.00	27.36
Professional agricultural qualification	0.00	0.00	0.00	3.13	0.00	0.00	0.00	0.00	1.79	0.63

Source: Survey with agricultural producers, 2020

Overall level of competitiveness of Bulgarian farms

The multi-criteria assessment of the competitiveness of agricultural holdings in the country shows that it is at a *good level* with a competitiveness index of 0.4 (Figure 1). The relatively high *sustainability* of farms (index 0.49) and, to a lesser extent, their good *financial security* (index 0.41) contribute the most to maintaining this level of competitiveness. On the other hand, the *adaptability* of agricultural holdings is relatively lower (index 0.39) and their *economic efficiency* is low (index 0.29). Therefore, the low potential for adaptation and the unsatisfactory economic efficiency contribute to the greatest extent to the decreasing of the competitiveness of the Bulgarian farms, as they are critical for the maintenance and restrict the increase of its level.

Figure 1. Level of competitiveness of agricultural holdings in Bulgaria



Source: Author's calculations

The analysis of the individual indicators of competitiveness shows the factors that most contribute to or limit the competitiveness of agricultural holdings in the country. At the present stage, the increase in the competitiveness of farms is limited by their extremely low *productivity* (0.16), *profitability* (0.19), *financial capability* (0.31) and *adaptability* to changes in the natural environment (warming, extreme weather, droughts, storms, etc.) - 0.33 (Figure 2). Both public support for farms and their management development strategies should be focused on these areas that are critical to competitiveness.

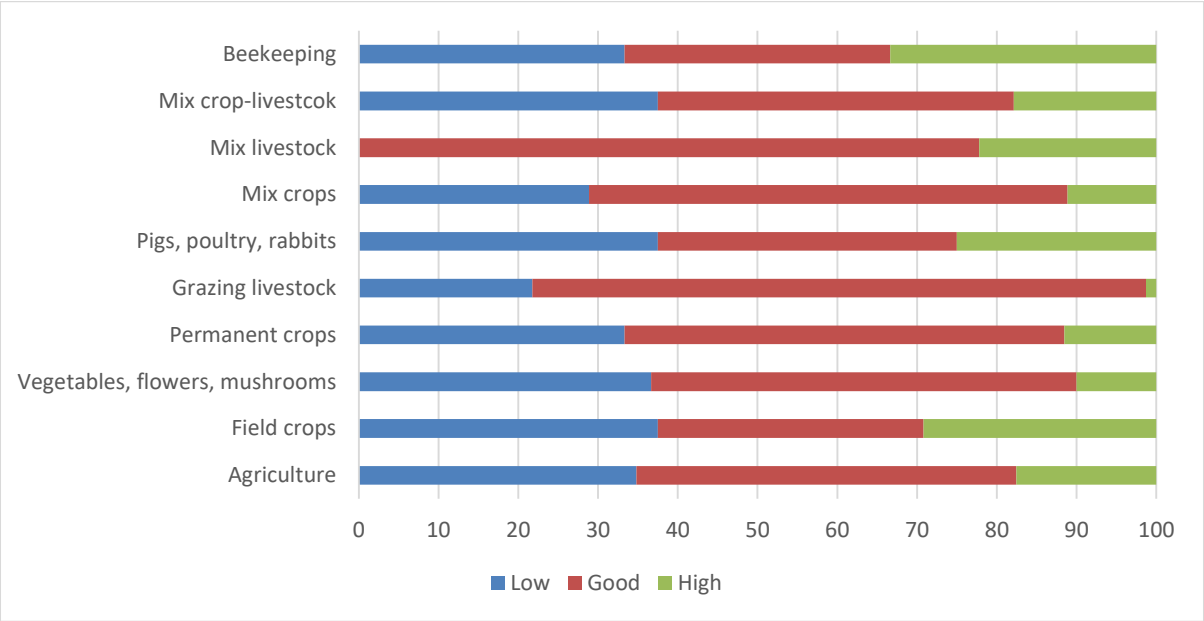
On the other hand, a number of indicators for the competitiveness of farms are at a high level and show the comparative and absolute competitive advantages of country's farms. To the greatest extent to increasing the competitiveness of agricultural holdings at the present stage contribute the *lack of serious problems and difficulties in the efficient supply of necessary services* (0.56), *efficient supply of land and natural resources* (0.55), *efficient supply of materials, equipment and biological resources* (0.51) and *low dependence on external financing* (credit, state aid, etc.) or *high financial autonomy* (0.52).

Figure 2. Indicators for competitiveness of agricultural holdings in Bulgaria

Source: Author's calculations

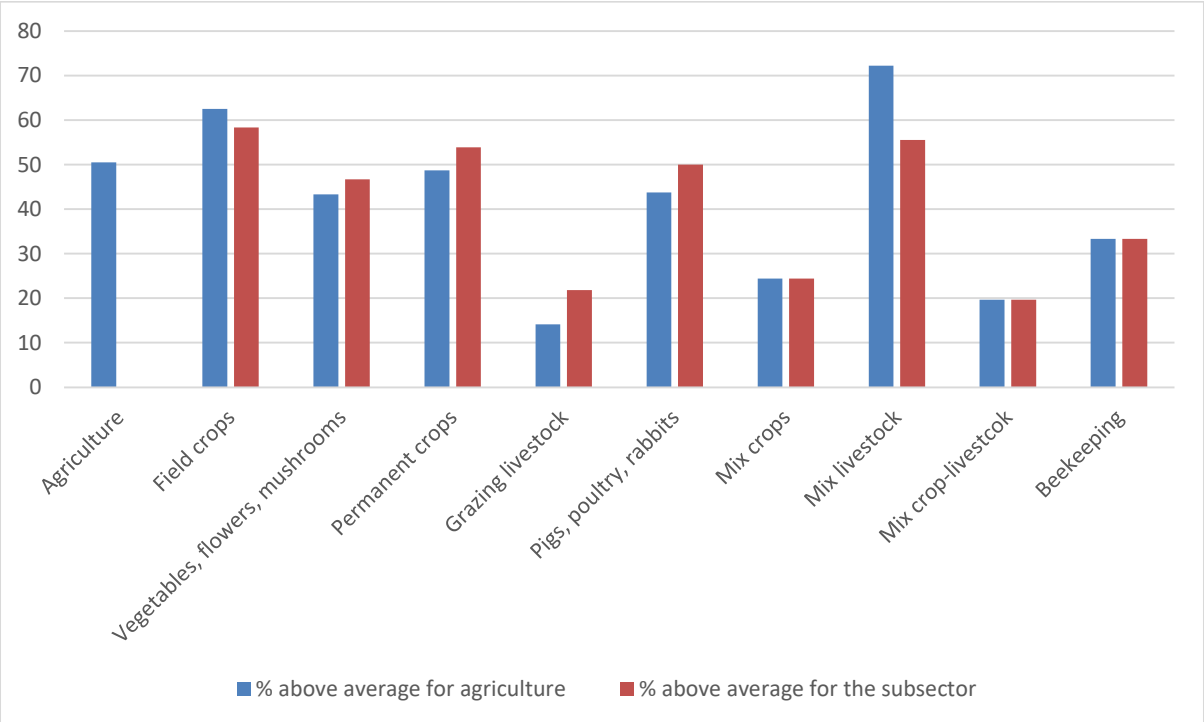
The assessment of the competitiveness of agricultural holdings shows that the majority of them (47.65%) are with a good competitiveness (Figure 3). Slightly more than half of the Bulgarian farms (50.47%) have a level of competitiveness above the national average (Figure 4), and only 17.55% of all farms in the country have a high level of competitiveness.

Figure 3. Share of agricultural holdings with different level of competitiveness in Bulgaria (%)



Source: Author's calculations

Figure 4. Share of agricultural holdings with a level of competitiveness above the national average and the sub-sector in Bulgaria

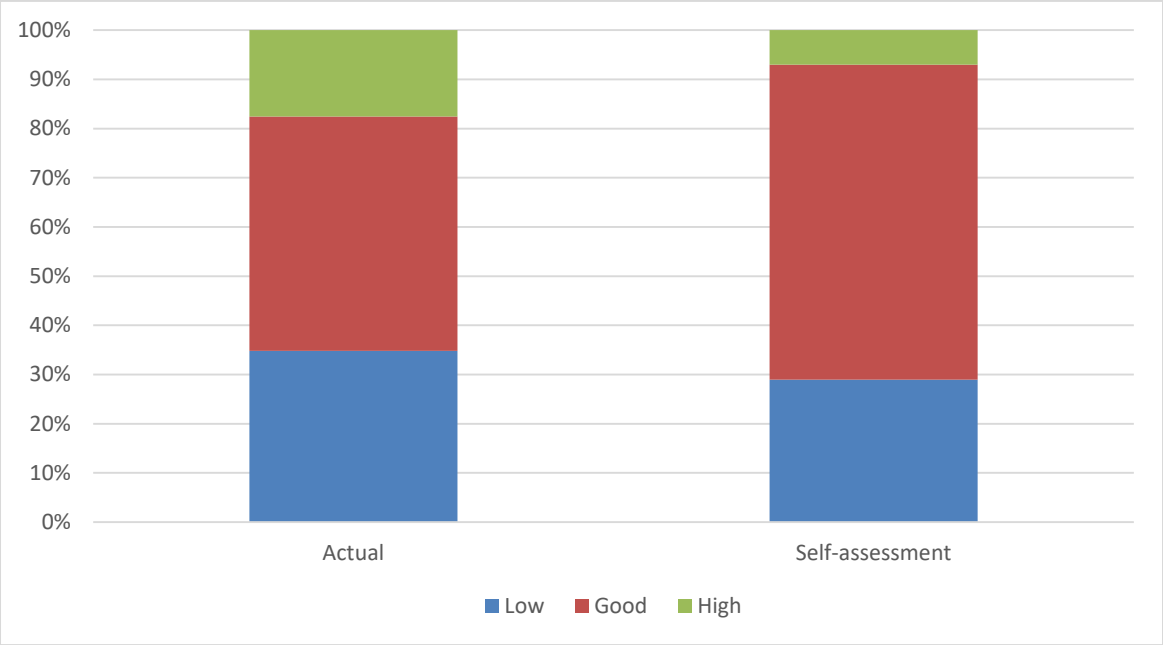


Source: Author's calculations

At the same time, however, more than a third of all farms (34.8%) have a low level of competitiveness. This means that a large part of Bulgarian farms will cease to exist in the near future due to insufficient competitiveness if timely measures are not taken to increase competitiveness by improving the management and restructuring of farms, adequate state support, etc.

The vast majority of managers surveyed (64%) rated the competitiveness of their farms as good (Figure 5). The self-assessment of a large part of the managers differs from the multicriteria assessment made in the study, as the deviations are in both directions. Every tenth manager underestimates the (higher) level of competitiveness of their farm, and about 5% overestimate it. This means that independent multi-criteria assessments of competitiveness for the real situation would raise awareness and improve the management of a significant part of the country's farms.

Figure 5. Comparison of the multicriteria assessment with the self-assessment of the managers for the competitiveness of the agricultural holdings in Bulgaria



Source: Author's calculations, Survey with agricultural producers, 2020

The analysis of the share of farms with different levels of competitiveness indicators gives a clear idea of the situation in the country. The majority of Bulgarian farms have productivity and profitability, well below the national average - 68.54% and 62.79%, respectively (Table 3). Also, a significant part of the farms have low financial capability (38.02%), high dependence on external financing (loan, subsidies, etc.) (23.95%) and low ability to pay their current liabilities (26.58%) (Table 4).

In addition, 31.65% of country‘s farms have low adaptability to changes in the market environment (demand, prices, competition, etc.), 18.99% have insufficient adaptability to the institutional environment and constraints (national and European requirements for quality, safety, environment, etc.), and 36.39% have a low ability to adapt to changes in the natural environment (warming, extreme weather, drought, storms, etc.) (Table 5).

According to the managers of a large part of the farms in the country (15.71%), their farms have low sustainability in the medium term and are likely to cease to exist due to bankruptcy, cessation of business, acquisition by competitors, etc. (Figure 6).

The survey also found that a significant part of the farms in the country have serious problems with the effective provision of the necessary labor force (30.5%), the necessary financing (20.89%), the necessary innovations and know-how (27.30%) and the effective marketing of production and services (18.85%) (Table 6). In addition, for every tenth farm there are major problems in the efficient supply of the necessary materials, equipment and biological resources (10.13%), for every ninth - in the effective supply of the necessary land and natural resources (8.68%), and for every seventh - in the effective supply of the necessary services (7.30%). All this contributes significantly to reducing the sustainability and competitiveness of a significant part of the holdings in the country.

The vast majority of managers (77.88%) evaluate the sustainability of their farms as good (Figure 7). In contrast to competitiveness, in the self-assessments for sustainability, there is almost a coincidence of the share of farms with low sustainability with that of the multi-criteria assessment in the study. However, there is a significant underestimation of the level of "real" sustainability in the self-assessment of managers of farms with high sustainability - a little over 5 times. This means that many farm managers do not have an accurate idea of the real level of (economic) sustainability of the farms they manage. Therefore, holistic "external" sustainability assessments, such as in this study, would greatly improve the awareness, self-confidence and overall management of a significant part of the country's farms.

Table 3. Share of agricultural holdings with different level of indicators for economic efficiency in Bulgaria (percentage)

Indicators levels	Agriculture	Field crops	Vegetables, flowers and mushrooms	Permanent crops	Grazing livestock	Pigs, poultry and rabbits	Mix crops	Mix livestock	Mix crop-livestcok	Beekeeping
Productivity										
Low	22.40	12.50	13.79	30.77	28.13	31.25	18.18	11.11	23.21	33.33
Good	71.92	70.83	82.76	61.54	71.88	62.50	81.82	83.33	75.00	44.44
High	5.68	16.67	3.45	7.69	0.00	6.25	0.00	5.56	1.79	22.22
Profitability										
Unsatisfactory	25.55	16.67	17.24	32.05	31.25	25.00	22.73	16.67	28.57	44.44
Good	69.40	70.83	79.31	61.54	68.75	75.00	75.00	77.78	69.64	33.33
High	5.05	12.50	3.45	6.41	0.00	0.00	2.27	5.56	1.79	22.22
Gross output*										
Similar to the avarage	10.93	16.67	10.71	9.86	3.13	0.00	20.45	6.67	3.57	28.57
A little more than the avarage	3.64	12.50	3.57	4.23	3.13	0.00	0.00	0.00	5.36	0.00
A lot more than the avarage	1.32	0.00	0.00	1.41	0.00	0.00	2.27	0.00	3.57	0.00
A little less than the avarage	15.56	25.00	7.14	11.27	12.50	6.67	22.73	26.67	17.86	0.00
A lot less than the avarage	68.54	45.83	78.57	73.24	81.25	93.33	54.55	66.67	69.64	71.43
Net Income**										
Similar to the avarage	10.63	16.67	10.71	9.72	0.00	0.00	20.93	0.00	5.36	28.57
A little more than the avarage	4.65	12.50	3.57	6.94	3.23	0.00	0.00	6.67	5.36	0.00
A lot more than the avarage	1.66	0.00	0.00	2.78	0.00	0.00	2.33	0.00	3.57	0.00

A little less than the avarage	20.27	29.17	3.57	15.28	16.13	20.00	30.23	33.33	17.86	14.29
A lot less than the avarage	62.79	41.67	82.14	65.28	80.65	80.00	46.51	60.00	67.86	57.14

** Avarage for the country Gross output = 133200 BGL; ** Avarage for the country Net Income = 38000 BGL*

Source: Survey with agricultural producers, 2020

Table 4. Share of agricultural holdings with different level of indicators for financial endowment in Bulgaria (percentage)

Indicators levels	Agriculture	Field crops	Vegetables, flowers and mushrooms	Permanent crops	Grazing livestock	Pigs, poultry and rabbits	Mix crops	Mix livestock	Mix crop-livestcok	Beekeeping
Financial capability										
Low	38.02	26.09	46.43	40.26	51.61	50.00	28.89	22.22	39.29	44.44
Good	61.34	73.91	53.57	59.74	48.39	50.00	71.11	77.78	58.93	44.44
High	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	11.11
Dependaance from external financing (credit, state support, etc.)										
Low	27.83	30.43	28.57	28.38	28.13	26.67	25.58	16.67	30.36	33.33
Avarage	48.22	52.17	46.43	50.00	40.63	46.67	46.51	55.56	44.64	55.56
High	23.95	17.39	25.00	21.62	31.25	26.67	27.91	27.78	25.00	11.11
Possibility to pay current debts										
Low	26.58	25.00	31.03	24.68	43.75	33.33	15.56	22.22	32.14	22.22
Good	68.04	66.67	65.52	71.43	56.25	66.67	73.33	72.22	66.07	55.56
High	5.38	8.33	3.45	3.90	0.00	0.00	11.11	5.56	1.79	22.22

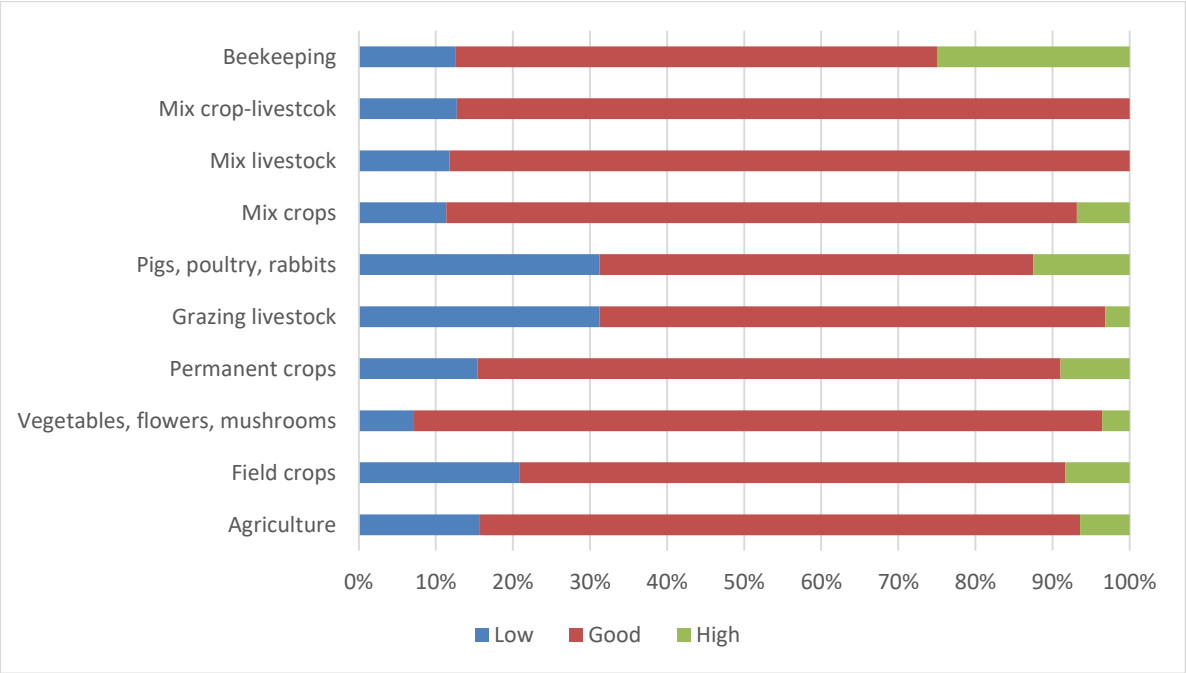
Source: Survey with agricultural producers, 2020

Table 5. Share of agricultural holdings with different levels of indicators for adaptability in Bulgaria (percentage)

Indicators levels	Agriculture	Field crops	Vegetables, flowers and mushrooms	Permanent crops	Grazing livestock	Pigs, poultry and rabbits	Mix crops	Mix livestock	Mix crop-livestcok	Beekeeping
Adaptability to the market (prices, demand, competition)										
Low	31.65	25.00	17.24	37.66	50.00	25.00	24.44	33.33	33.93	33.33
Good	62.66	62.50	72.41	59.74	46.88	62.50	73.33	61.11	64.29	33.33
High	5.70	8.33	10.34	3.90	3.13	12.50	2.22	5.56	0.00	33.33
Adaptability to the state and European requirements for quality, safety, environment, etc.										
Low	18.99	20.83	20.69	11.69	34.38	18.75	20.00	16.67	23.21	0.00
Good	68.35	66.67	72.41	77.92	65.63	62.50	64.44	50.00	66.07	66.67
High	12.66	12.50	6.90	10.39	0.00	18.75	15.56	33.33	8.93	33.33
Adaptability to changes in the natural environment (warming, extreme weather, drought, storms, etc.)										
Low	36.39	29.17	34.48	41.56	34.38	37.50	33.33	22.22	46.43	22.22
Good	60.44	66.67	65.52	55.84	59.38	62.50	64.44	61.11	51.79	66.67
High	3.16	0.00	0.00	3.90	0.00	0.00	2.22	16.67	3.57	11.11

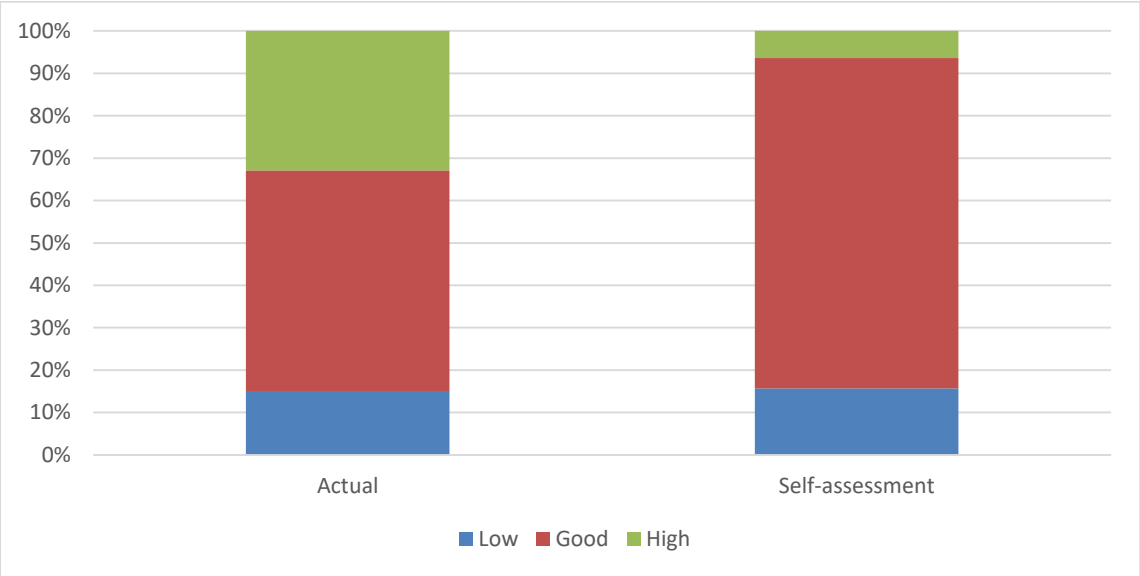
Source: Survey with agricultural producers, 2020

Figure 6. How do you assess the sustainability of agricultural holding in the medium term?



Source: Survey with agricultural producers, 2020

Figure 7. Comparison of the multicriteria assessment with the self-assessment of the managers for the sustainability of the agricultural holdings in Bulgaria



Source: Author's calculations, Survey with agricultural producers, 2020

Table 6. Share of agricultural holdings with different levels of indicators for sustainability in Bulgaria (percentage)

Indicators type	Agriculture	Field crops	Vegetables, flowers and mushrooms	Permanent crops	Grazing livestock	Pigs, poultry and rabbits	Mix crops	Mix livestock	Mix crop-livestcok	Beekeeping
Nature of the problems in effective supply of necessary land and natural resources										
Insignificant	18.65	20.83	22.22	14.29	18.75	40.00	20.45	11.11	14.55	50.00
Normal	72.67	75.00	77.78	75.32	62.50	53.33	72.73	72.22	78.18	37.50
Significant	8.68	4.17	0.00	10.39	18.75	6.67	6.82	16.67	7.27	12.50
Nature of the problems in effective supply of necessary labor force										
Insignificant	16.67	16.67	27.59	10.26	18.75	18.75	8.89	5.56	25.00	44.44
Normal	52.83	66.67	51.72	53.85	40.63	68.75	53.33	50.00	50.00	33.33
Significant	30.50	16.67	20.69	35.90	40.63	12.50	37.78	44.44	25.00	22.22
Nature of the problems in effective supply of necessary materials, equipment and biological resources										
Insignificant	12.97	12.50	24.14	10.53	9.38	6.25	13.33	11.11	12.50	33.33
Normal	76.90	79.17	65.52	75.00	78.13	81.25	82.22	77.78	76.79	66.67
Significant	10.13	8.33	10.34	14.47	12.50	12.50	4.44	11.11	10.71	0.00
Nature of the problems in effective supply of necessary funding										
Insignificant	12.03	4.17	10.34	15.58	9.68	0.00	13.33	16.67	14.29	22.22
Normal	67.09	83.33	58.62	70.13	54.84	87.50	57.78	72.22	62.50	77.78
Significant	20.89	12.50	31.03	14.29	35.48	12.50	28.89	11.11	23.21	0.00
Nature of the problems in effective supply of necessary services										
Insignificant	18.41	8.33	27.59	21.05	15.63	25.00	15.56	16.67	19.64	22.22
Normal	74.29	79.17	72.41	71.05	75.00	62.50	80.00	72.22	73.21	77.78
Significant	7.30	12.50	0.00	7.89	9.38	12.50	4.44	11.11	7.14	0.00
Nature of the problems in effective supply of necessary innovations and know-how										

Insignificant	17.46	16.67	14.29	21.79	18.75	18.75	17.78	23.53	12.50	11.11
Normal	55.24	58.33	57.14	61.54	37.50	50.00	53.33	52.94	55.36	88.89
Significant	27.30	25.00	28.57	16.67	43.75	31.25	28.89	23.53	32.14	0.00
Nature of the problems in effective realization of the products and services										
Insignificant	12.46	20.83	17.86	14.29	6.45	12.50	11.11	5.56	10.71	12.50
Normal	68.69	66.67	71.43	63.64	67.74	62.50	75.56	83.33	67.86	62.50
Significant	18.85	12.50	10.71	22.08	25.81	25.00	13.33	11.11	21.43	25.00

Source: Survey with agricultural producers, 2020

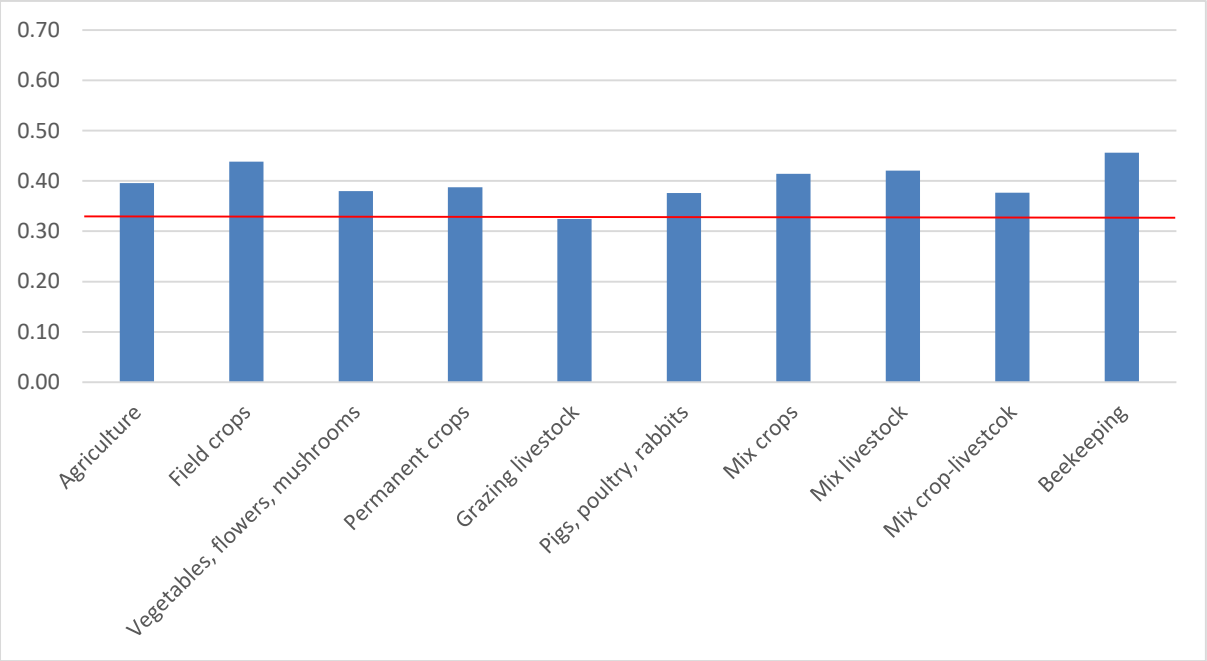
Level of competitiveness of farms with different specialization

There is a significant variation in the level of competitiveness of agricultural holdings with different production specializations (Figure 8). The farms with the highest *good* competitiveness are in the bee sector (0.46), followed by those specialed in field crops (0.44), mixed livestock (0.42), and mixed crop production (0.41).

Farms in a number of major agricultural sub-sectors are with a good competitiveness, but below the national average – permanent crops (0.39), vegetables, flowers and mushrooms (0.38), pigs, poultry and rabbits (0.38) and mixed crop-livestock (0.38) .

The weakest is the competitiveness of farms specializing in grazing livestock , which is at a *low* level (0.32).

Figure 8. Competitiveness of agricultural holdings with different specialization in Bulgaria



Source: Author's calculations

The analysis of the individual aspects of the competitiveness of farms with different specializations shows that most types have low economic efficiency and it contributes the most to the deterioration of their competitiveness (Figure 9). Only farms specializing in field crops have good economic efficiency.

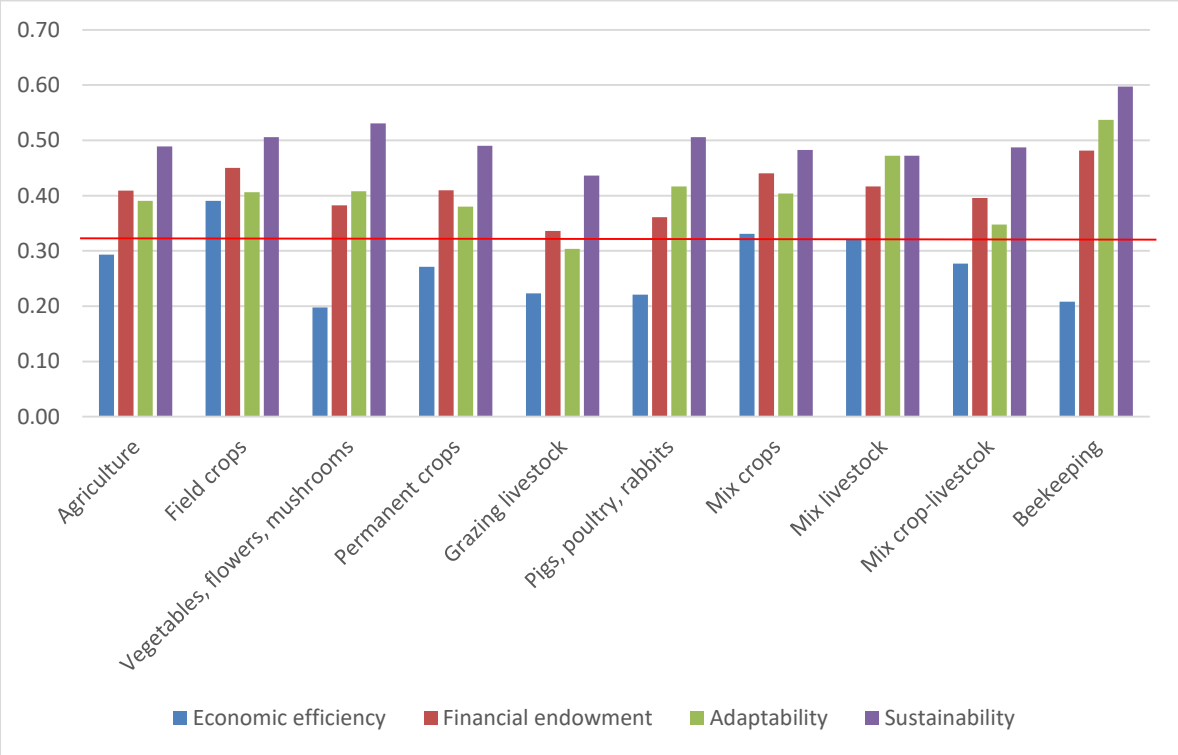
The farms with specialization in beekeeping (0.48) have the best financial endowment, followed by field crops (0.45) and mixed crop farms (0.44). The financial endowment of farms specialized in mixed crop and livestock production (0.4), vegetables, flowers and mushrooms (0.38), pigs, poultry and rabbits (0.36) and grazing animals (0.34) is below the national average, the latter group being close to the low level.

The farms with specialization in beekeeping (0.54), mixed animal husbandry (0.47) and pigs, poultry and rabbits (0.42) have the highest adaptability. The potential for adaptation to changes in the market, institutional and natural environment in farms specializing in permanent

crops (0.38) and mixed crop and livestock (0.35) is below the industry average, and in farms with grazing animals - at a low level (0.3).

The sustainability of most types of farms is relatively good and close to the national average. With the lowest sustainability, within the limits of the good level, are the farms specialized in the grazing livestock (0.44). The sustainability of the other groups of farms is at a high level, with maximum value for those specialized in beekeeping.

Figure 9. Level of competitiveness of agricultural holdings with different specialization by main criteria for competitiveness in Bulgaria

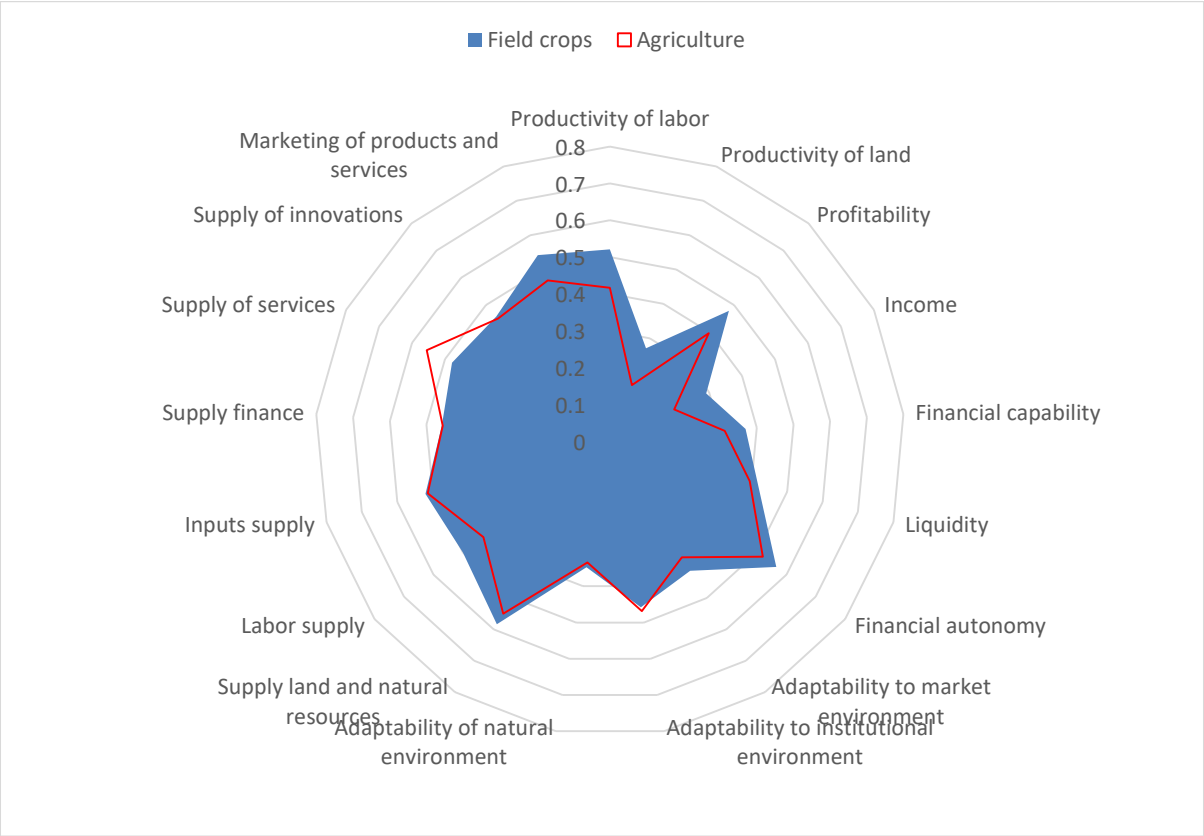


Source: Author's calculations

Most of the indicators of competitiveness of farms specializing in *field crops* have values higher than the national average (Figure 10). Only in terms of adaptability to the institutional environment and efficiency of service provision, these farms have lower than average levels.

The competitiveness of farms specializing in the cultivation of field crops is maintained by high productivity, liquidity, financial autonomy, adaptability to the market environment, efficiency in the supply of land and natural resources, materials, machinery and biological resources, finance, services and innovation, and efficient realization of products and services. The main factors for reducing the competitiveness of farms with field crops are low productivity (0.27) and profitability (0.29), as well as close to the low level, adaptability to the natural environment (0.35).

Figure 10. Indicators for competitiveness of agricultural holdings in the sector "Field crops" in Bulgaria

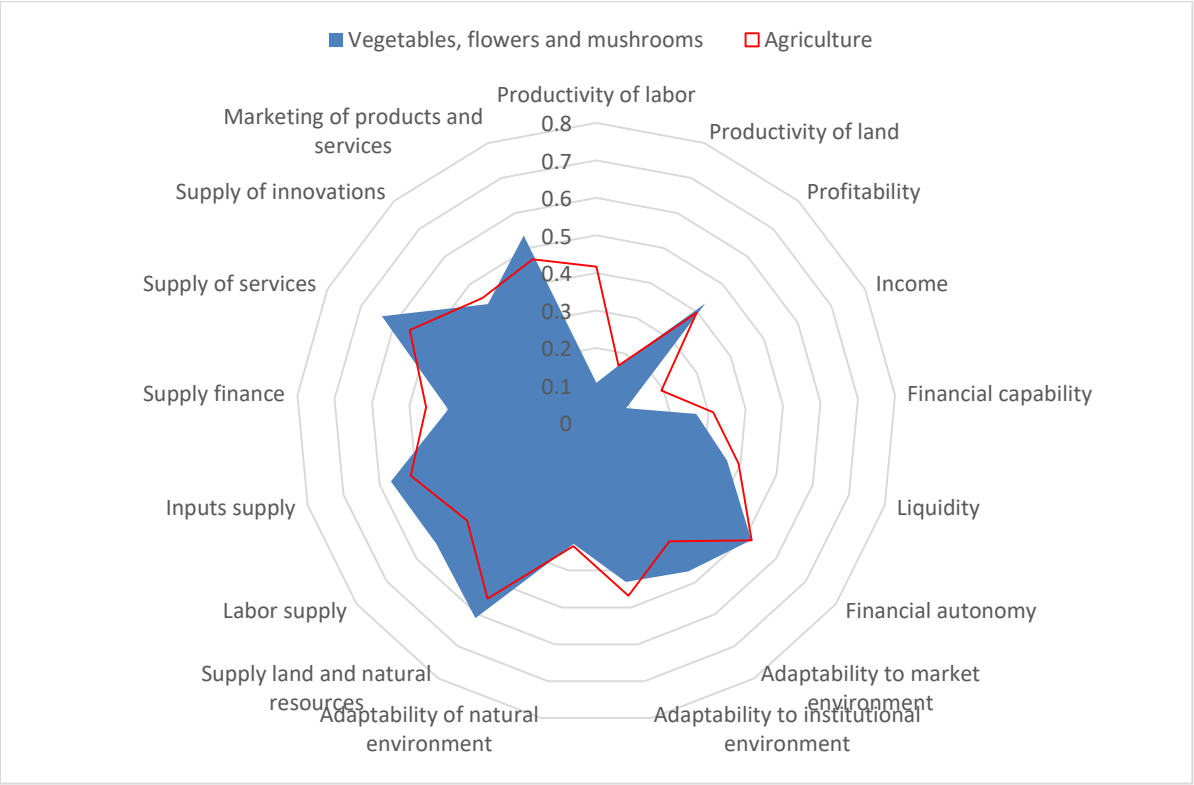


Source: Author's calculations

Many of the indicators of competitiveness of farms specializing in the cultivation of *vegetables, flowers and mushrooms* have values lower than the national average (Figure 11). However, in many respects, these farms have higher than average positions - profitability, adaptability of the market environment, efficiency in the supply of land and natural resources, labor, materials, machinery and biological resources, services, and in the sale of products and services.

Main for maintaining the competitive position of this type of farms are high financial autonomy, efficiency in the supply of land and natural resources, labor, materials, equipment and biological resources, services and sales of products and services. The main factors for reducing the competitiveness of those specialized in the cultivation of vegetables, flowers and mushrooms are low productivity (0.11), productivity (0.16), profitability (0.09), financial capability (0.27) and adaptability to the natural environment (0.33).

Figure 11. Indicators for competitiveness of agricultural holdings in the sector "Vegetables, flowers and mushrooms" in Bulgaria

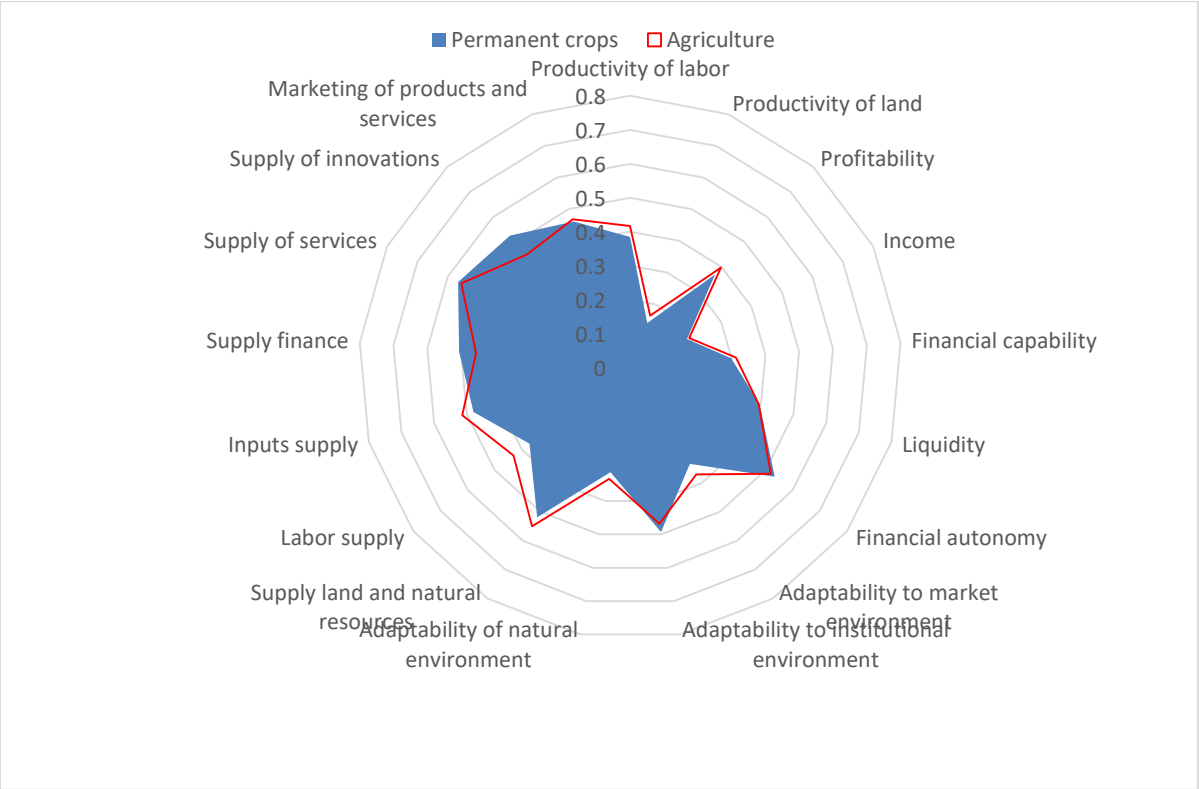


Source: Author's calculations

The majority of indicators for the competitiveness of farms specialized in the cultivation of *permanent crops* have values lower than the national average (Figure 12). However, in some areas, these farms have better-than-average positions, such as financial autonomy, adaptability to the institutional environment and efficiency in the supply of finance, services and innovation.

The competitiveness of this type of farms is maintained by high financial autonomy, adaptability to the institutional environment, efficiency in the supply of land and natural resources, services and innovation. The most important for the deterioration of the competitive position of the farms specializing in the cultivation of perennial crops are low productivity (0.14), profitability (0.19), financial capability (0.3), adaptability to the market (0.33) and natural (0.31) environment.

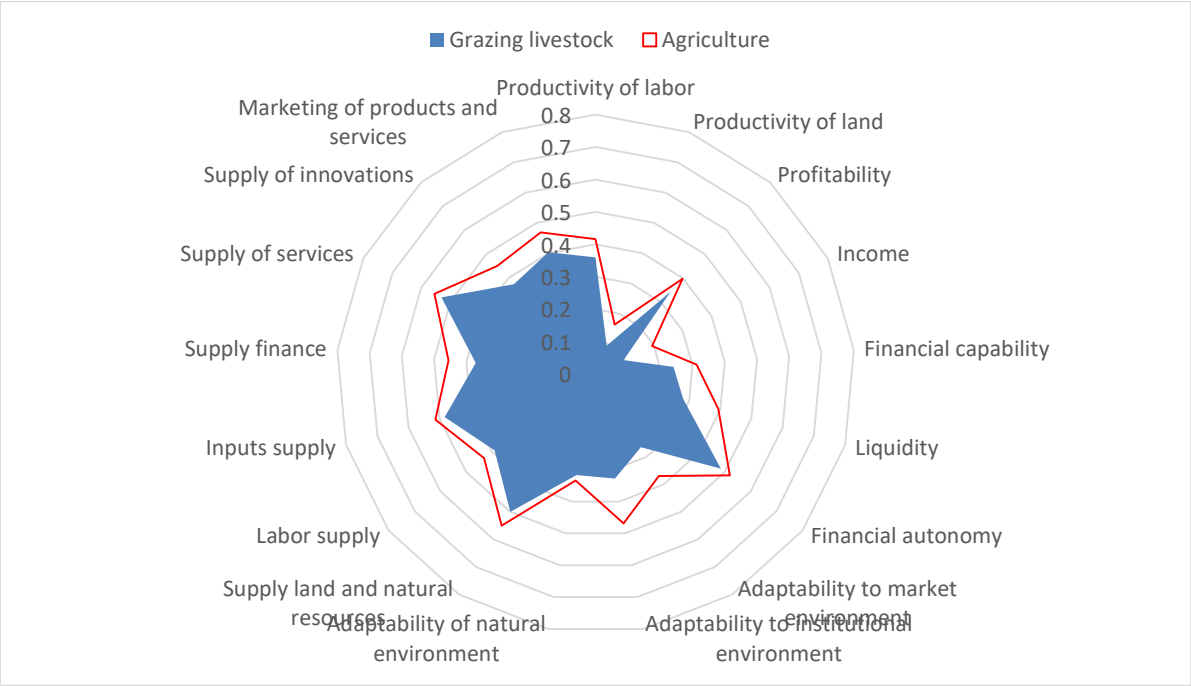
Figure 12. Indicators for competitiveness of agricultural holdings in the sector "Permanent crops" in Bulgaria



Source: Author's calculations

All indicators of competitiveness of farms specializing in *grazing livestock* have values lower than the national average (Figure 13). The low productivity (0.09), profitability (0.1), financial capability (0.24), liquidity (0.28) and adaptability to the market (0.27), institutional (0.33) and natural (0.32) environment contribute the most to the unsatisfactory competitiveness of this type of farms. The main factor for raising the competitive position of farms in grazing animals is the high efficiency in their supply of services.

Figure 13. Indicators for competitiveness of agricultural holdings in the sector "Grazing livestock" in Bulgaria

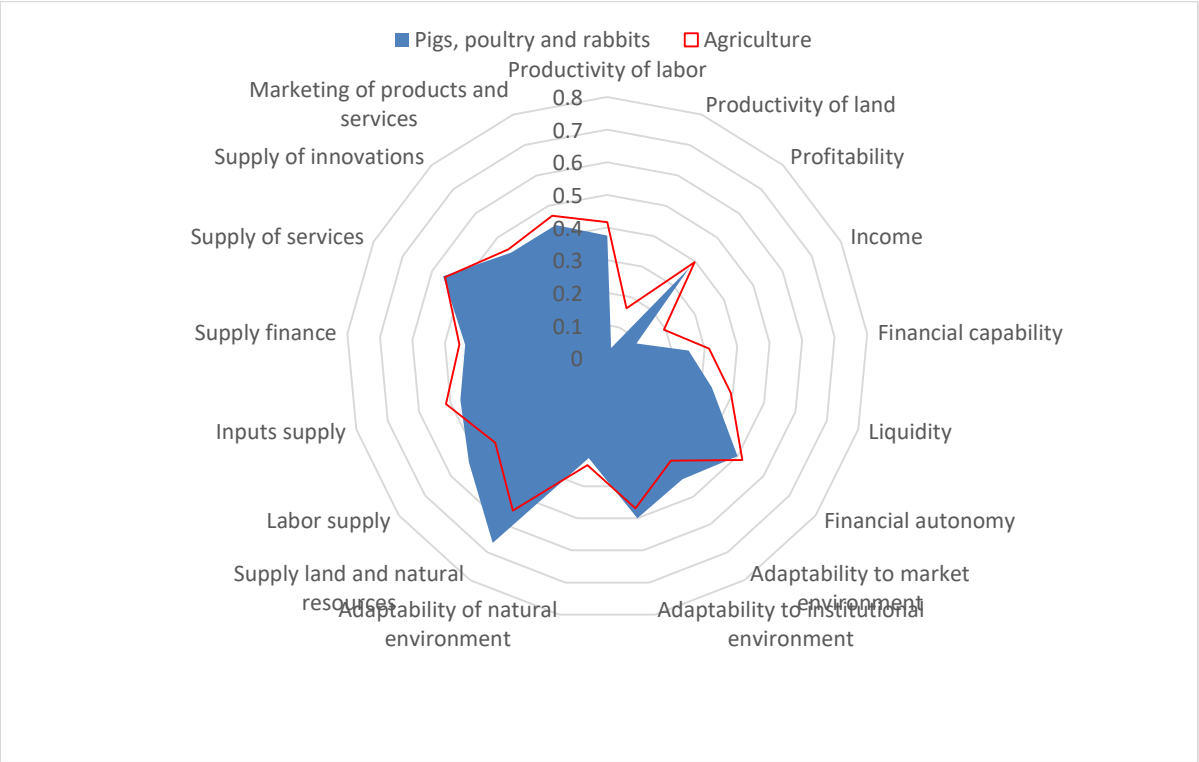


Source: Author's calculations

Most of the competitiveness indicators of farms specializing in *pigs, poultry and rabbits* have values lower than the national average (Figure 14). However, in several respects, these farms have better-than-average positions, such as adaptability to the market and institutional environment, efficiency in the supply of land and natural resources, labor and services.

The most important for maintaining the competitiveness of this type of farms are the high efficiency in the supply of land and natural resources, labor and services. Critical for the competitive positions of farms specializing in pigs, poultry and rabbits are low productivity (0.03), profitability (0.1), financial capability (0.25), liquidity (0.33) and adaptability to changes in the natural environment (0.31).

Figure 14. Indicators for competitiveness of agricultural holdings in the sector "Pigs, poultry and rabbits" in Bulgaria

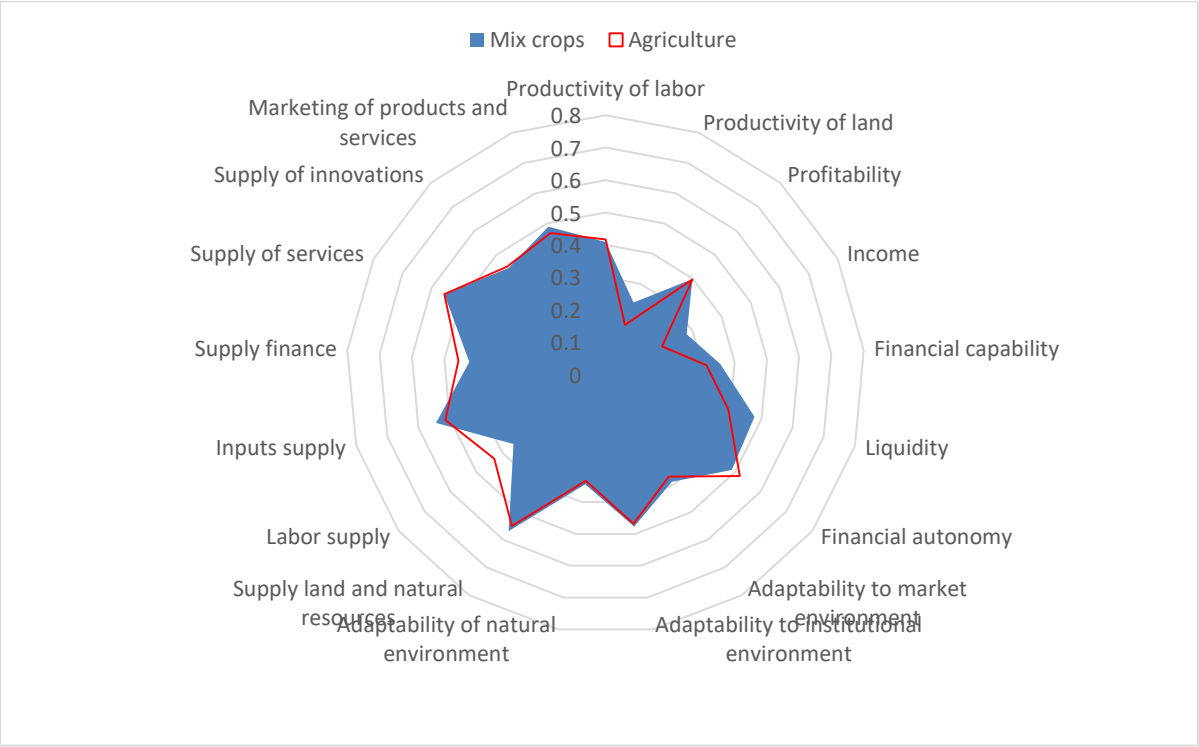


Source: Author's calculations

Many of the indicators of competitiveness of farms specializing in *mixed crop* production have values lower than the national average (Figure 15). However, in many areas, this type of farms have relatively better than average positions, such as profitability, financial capability, liquidity, adaptability to the market, institutional and natural environment, and efficiency in the supply of land and natural resources, materials, equipment and biological resources. and in the realization of products and services.

Central to maintaining the competitiveness of these farms are high efficiency in the supply of land and natural resources, materials, machinery and biological resources and services. At the same time, however, the competitive position of mixed crop farms is compromised by low productivity (0.24) and income (0.28), and close to the low level of adaptability to changes in the natural environment (0.34).

Figure 15. Indicators for competitiveness of agricultural holdings in the sector "Mix crops" in Bulgaria

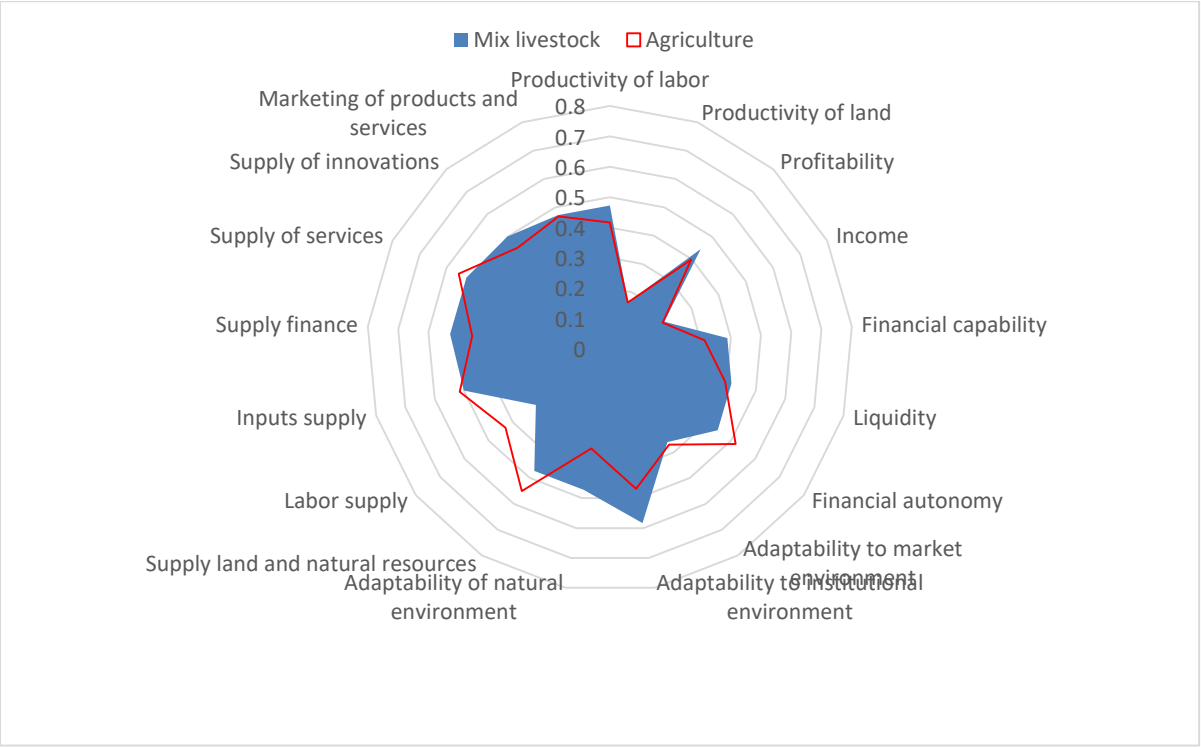


Source: Author's calculations

Many of the competitiveness indicators of *mix livestock* farms are higher than the national average (Figure 16). The farms specialized in this field are superior to other farms in terms of productivity, profitability, financial capability, liquidity, adaptability to the institutional and natural environment, efficiency in the supply of finance and innovation, and in the sale of products and services. The other indicators of competitiveness of this type of farms are lower or around the average levels for the country.

The high adaptability to the institutional environment and the efficiency in the supply of finances and services contribute the most to maintaining the competitive positions of the mixed livestock farms. At the same time, however, the indicators of productivity (0.17), profitability (0.2) and efficiency in labor supply (0.31) are low and limit the improvement of the overall competitiveness of these farms.

Figure 16. Indicators for competitiveness of agricultural holdings in the sector "Mix livestock" in Bulgaria

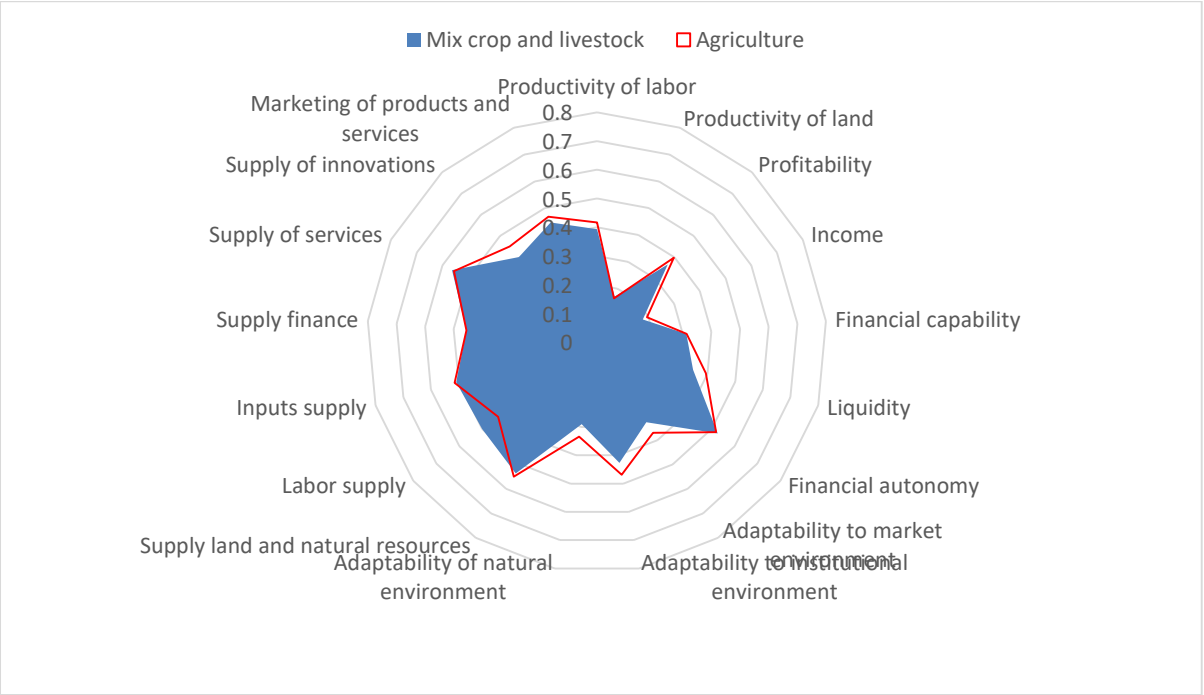


Source: Author's calculations

Almost all indicators of competitiveness of *mixed crop - livestock* farms are lower or close to the national average (Figure 17). These farms are above average only in terms of financial autonomy and efficiency in the supply of labor and services.

High financial autonomy and efficiency in the supply of land and natural resources, materials, machinery and biological resources and services contribute the most to maintaining the competitive position of this type of farms. At the same time, low productivity (0.17), profitability (0.18), financial capability (0.31), and adaptability to changes in the market (0.33) and natural (0.29) environment are critical for the competitiveness of mixed crop and livestock farms.

Figure 17. Indicators for competitiveness of agricultural holdings in the sector "Mix crop and livestock" in Bulgaria

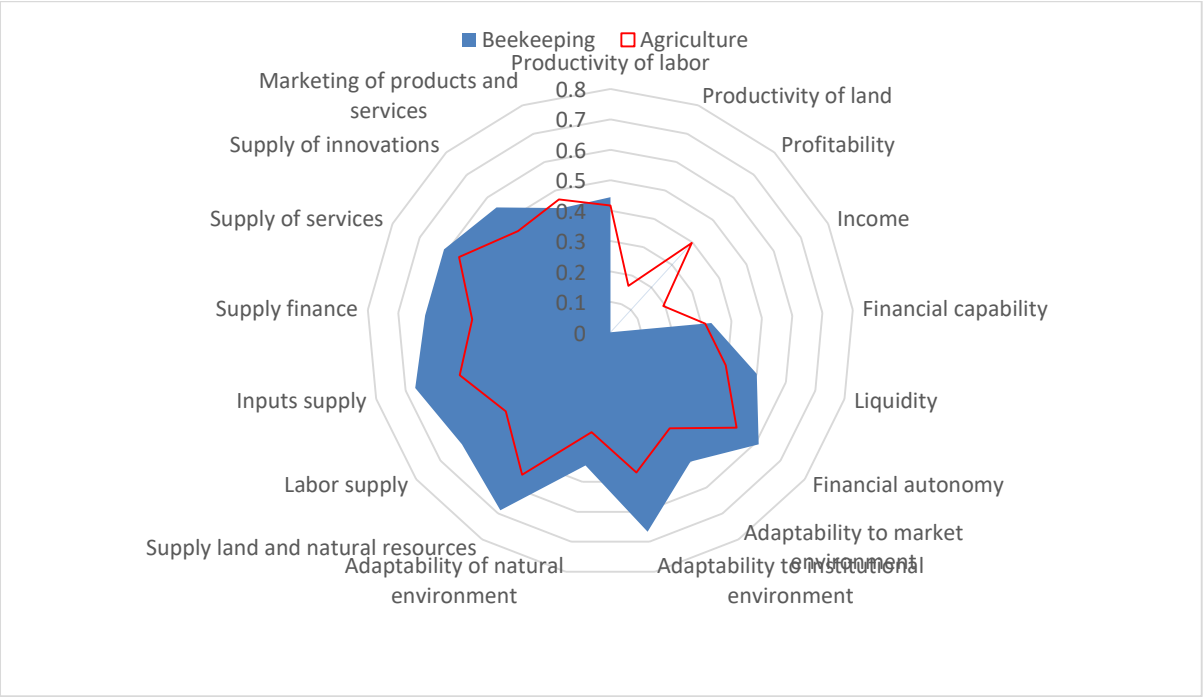


Source: Author's calculations

Almost all indicators of competitiveness of farms specializing in *beekeeping* are higher than the national average, with the exception of indicators of productivity, profitability, income and efficiency in the sale of products and services (Figure 18).

The competitiveness of this type of farms is favored by the high level of financial autonomy, adaptability to the institutional environment, efficiency in the supply of resources, services and innovation. At the same time, however, low productivity and profitability are the factors that worsen the competitive position of beekeepers.

Figure 18. Indicators for competitiveness of agricultural holdings in the sector "Beekeeping" in Bulgaria



Source: Author's calculations

The assessment of competitiveness for agricultural holdings shows that the majority of those specialized in *field crops* (62.5%) and *mixed livestock* (72.22%) have a level of competitiveness above the national average (Figure 4). The lowest share of farms with competitiveness exceeding the national average is in the sectors of *grazing animals* (14.1%), *mix crop - livestock* (19.64%), *mix crops* (24.44%) and *bees* (one third).

There are also big differences in the share of farms in the different types of specialization with exceeding the average for the respective sub-sector (type) competitiveness. While in field crops 58.33% of farms are competitive above the average for this sector, in mixed crop - livestock farms they are only 19.64% (Figure 4). The share of farms with a competitiveness superior to that of the sector in herbivores (21.79%) and bees (one third) is also very low.

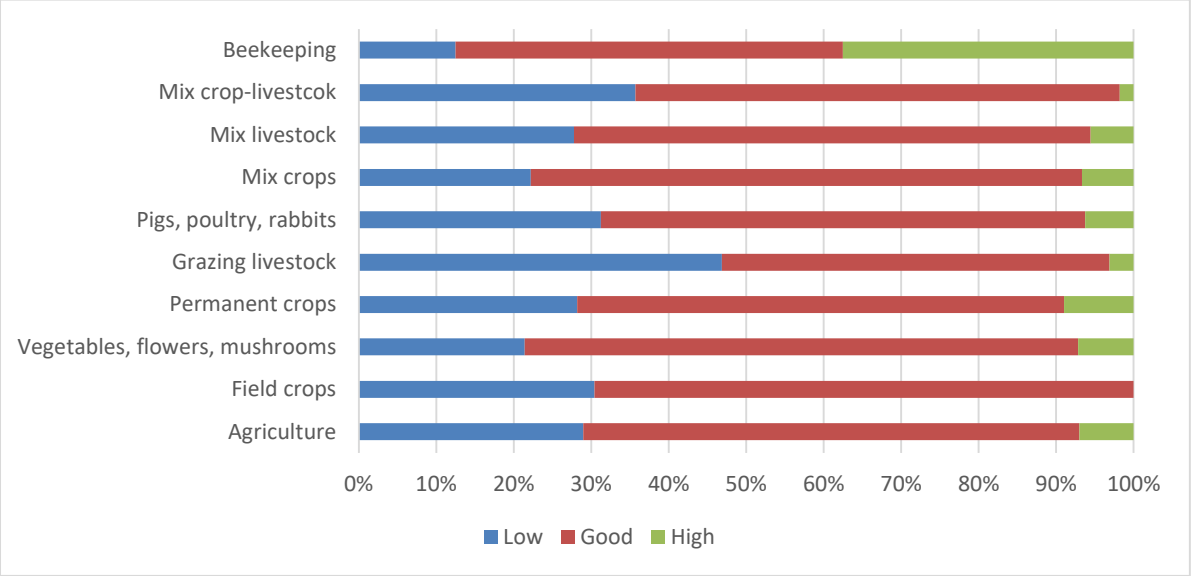
The largest share of farms with high competitiveness is in the sectors of bees (one third), field crops (29.17%), pigs, poultry and rabbits (a quarter) and mixed livestock (22.22%), and the smallest in farms specialized in grazing animals - only 1.28% (Figure 3). At the same time, the share of farms with low competitiveness in each type of specialization is significant - field crops, pigs, poultry and rabbits, and mixed crop-livestock - 37.5% each, vegetables, flowers and mushrooms - 36.67%, perennials and bees - 33.33 %, mix crops - 28.89%, and grazing animals - 21.79%. Only in mixed livestock farms there are no ones with low competitiveness.

There is a discrepancy between the assessments of the level of competitiveness in the present analysis, with the self-assessments of the managers of the surveyed farms with different specialization (Figure 19). While the majority of beekeepers (37.50%) believe that their farms are highly competitive, in other groups of farms this percentage is much lower - from 1.8% (mix crop and livestock) to 9% (perennials). No manager in field crops puts the farm he runs in the group of highly competitive ones. At the same time, the share of managers who assess their farm as low competitive is large - 30.43% for field crops, 21.43% for vegetables, flowers

and mushrooms, 28.21% for perennials, 46.88% for grazing animals, 31.25% for pigs, poultry and rabbits, 22.22% in mix crops, 27.78% in mix livestock, 35.71% in mixed crop-livestock, and 12.5% in bees.

Therefore, independent multi-criteria evaluations such as those in this study would improve the awareness and management of farms that overestimate or underestimate their actual competitiveness.

Figure 19. How do you assess the competitiveness of the agricultural holding?



Source: Survey with agricultural producers, 2020

The survey of managers found that there are large differences in the share of farms of each type of specialization with different levels of competitiveness indicators. A significant part of the farms in all subsectors have productivity and profitability, well below the national average (Table 3). Also, a large proportion of farms specializing in perennials, pigs, poultry and rabbits, and beekeeping have low productivity and profitability.

The largest share of farms with low financial capability is in the following sectors: vegetables, flowers and mushrooms (46.43%), permanent crops (40.26%), grazing livestock (51.61%), pigs, poultry and rabbits (50%), and beekeeping (44.44%) (Table 4). Most farms with high dependence on external financing (loan, subsidies, etc.) are in the groups of herbivores (31.25%), mixed crop (27.91%) and mixed livestock (27.78%). The most significant is the share of farms with low ability to pay their current obligations in: vegetables, flowers and mushrooms (31.03%), grazing animals (43.75%), pigs, poultry and rabbits (every third) and mix crop and livestock (32.14 %).

Many farms in different types of specialization have insufficient potential to adapt to changes in the market, institutional and natural environment (Table 5). The largest share of farms with low adaptability to changes in the market environment (demand, prices, competition, etc.) are in the following sectors: permanent crops (37.66%), grazing animals (every second), mixed livestock, mixed crop-livestock, and bees (one third each). Most farms with insufficient adaptability to the institutional environment and restrictions (state and European requirements for quality, safety, environment, etc.) are among those specializing in grazing livestock (34.38%), and mixed crop-livestock farms (23.21%). There is also a

significant share of farms with low ability to adapt to changes in the natural environment (warming, extreme weather, drought, sleet, etc.), which varies from 22.22% in mixed livestock and bees, to 46.43% of all mixed crop - livestock farms in the country.

The survey found that the largest share of farm managers who believe that their farms are low sustainable in the medium term, among those specializing in: field crops (20.83%), grazing animals, and pigs, poultry and rabbits – by 31.25% (Figure 6).

The survey also found that a significant proportion of farms in the areas of perennials (35.9%), herbivores (40.63%), mixed crops (37.78%) and mixed livestock (44.44%) have serious problems and difficulties in effectively providing the needed labor force (Table 6). There are also many farms that have serious problems and difficulties in effectively providing the necessary funding - 31.03% of all farms specializing in growing vegetables, flowers and mushrooms, 35.48% - of those in grazing animals and 28.89% - of mixed crops. In addition, a large part of farms with grazing animals (43.75%), pigs, poultry and rabbits (31.25%), and mixed crop and livestock (32.14%) have serious problems and difficulties in effectively providing the necessary innovations and know-how. There are also many farms with perennial crops (22.08%), grazing animals (25.81%), pigs, poultry and rabbits, and bees (a quarter each), which have serious problems and difficulties in the effective sale of their products and services.

Factors determining the competitiveness of agricultural holdings

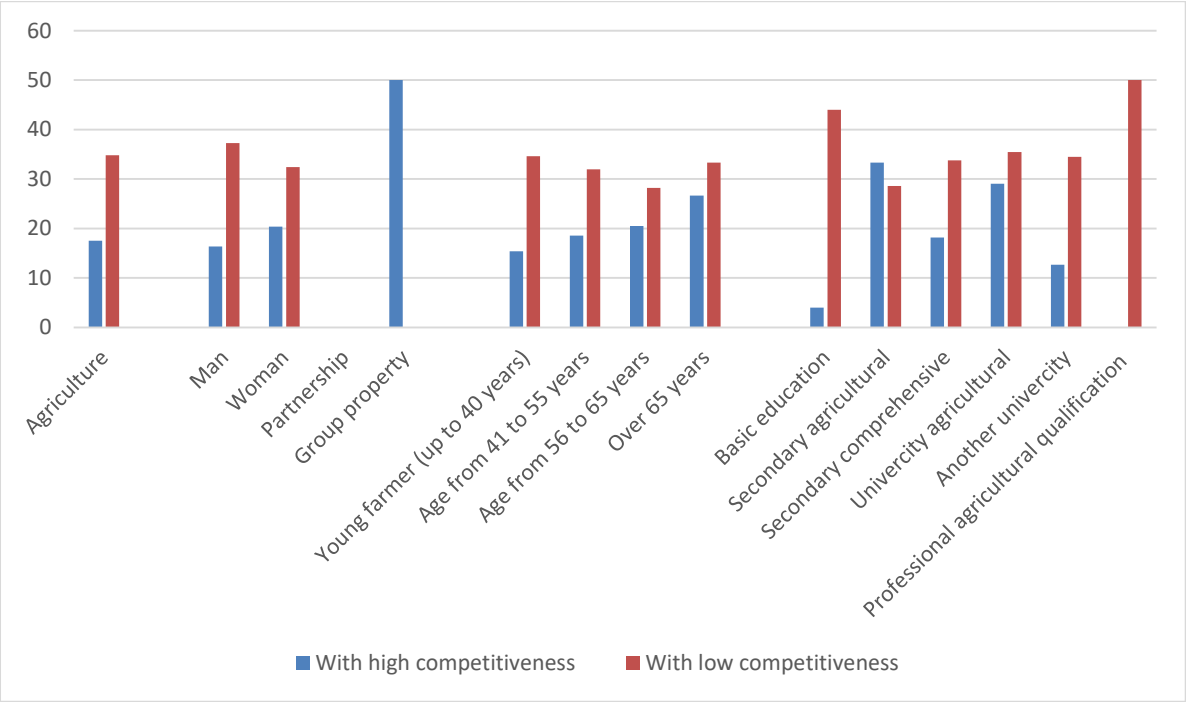
The conducted survey and assessment of competitiveness gives the opportunity to identify personal, organizational, market, institutional and others factors that affect (and predetermine) the competitiveness of agricultural holdings in the country.

The share of farms with high competitiveness with female managers (20.37%) is higher than the national average and on farms with male managers (16.33%) (Figure 20). At the same time, the share of farms with women managers with low competitiveness (32.41%) is lower than the national average and of farms with men managers (37.24%). Also, half of the group-owned farms are highly competitive, and there are no low-competitive farms among this type of farms. This proves that women's and group management is more effective in terms of competitiveness and their expansion would improve the overall competitiveness of Bulgarian farms.

The highest share of farms with high competitiveness is among managers over the age of 65 (26.67%) (Figure 20). It is also higher than the average and relative share of farms with high competitiveness of managers aged 56 to 65 (20.51%). At the same time, the relative share of farms with high competitiveness of managers - young farmers (up to 40 years old) is the smallest and below the national average. This confirms that practical experience, which improves with age, is an important factor in raising the competitiveness of farms.

Education is also a critical factor for increasing the competitiveness of farms. The share of farms with high competitiveness with managers with secondary (33.33%) and higher (29.03%) agricultural education is significantly above the national average and from farms with managers without agricultural education, with lower or other education (Figure 20).

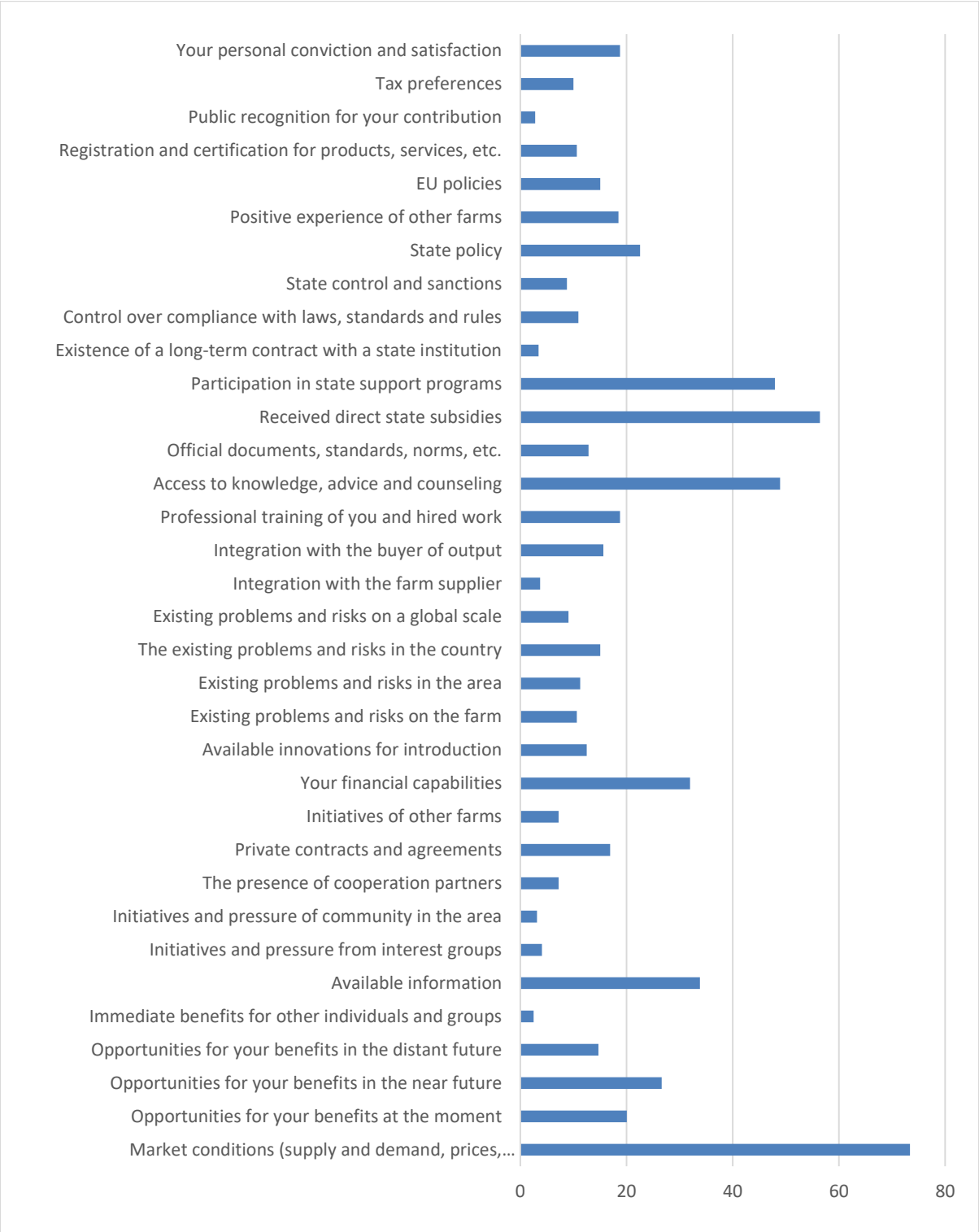
Figure 20. Share of farms with high and low competitiveness depending on gender, age and education of managers (owners) in Bulgaria



Source: Author's calculations

According to the majority of managers of the surveyed farms, the most significant factors for increasing the competitiveness of their farms are: market conditions (supply and demand, prices, competition) (73.35%), received direct state subsidies (56.43%), access to knowledge, consultations and advice (48.9%), participation in government support programs (47.96%), available information (33.86%), financial opportunities (31.97%), and opportunities for benefits in the near future (26.65%) (Figure 20).

Figure 21. Which factors contribute the most to increasing the competitiveness of your farm (% of farms)?

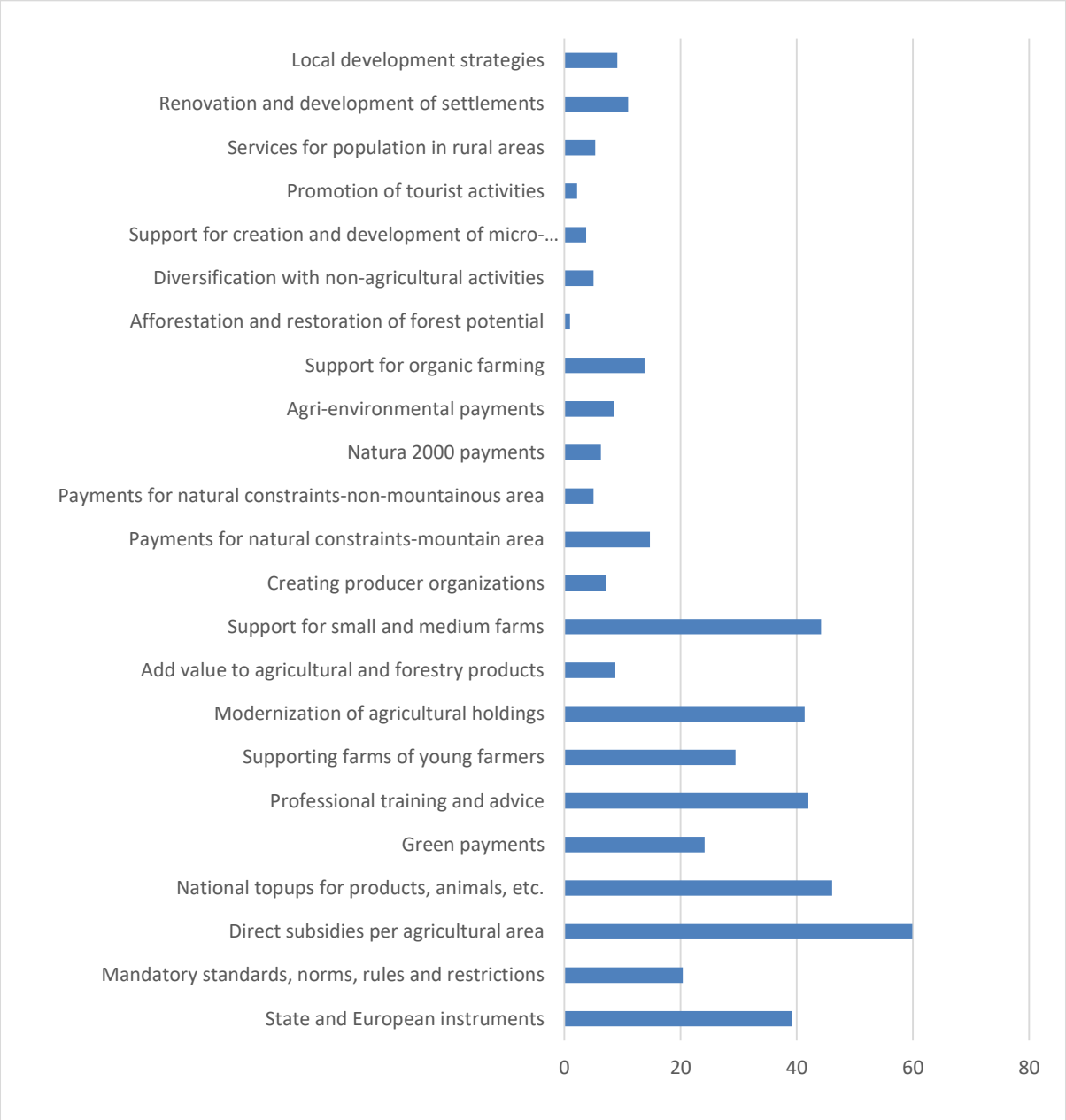


Source: Survey with agricultural producers, 2020

According to the majority of managers for increasing the competitiveness of farms, the most important instruments of public policies are: direct subsidies per land area (59.87%), national topups for products, animals and others (46.08%), support for small and medium-sized

farms (44.20%), vocational training and advice (42.01%), modernization of agricultural holdings (41.38%), state and European instruments (39.18%), support for holdings of young farmers (29.47%), and green payments (24.14%) (Figure 22).

Figure 22. Which policy instruments increase the competitiveness of your farm the most (% of farms)?



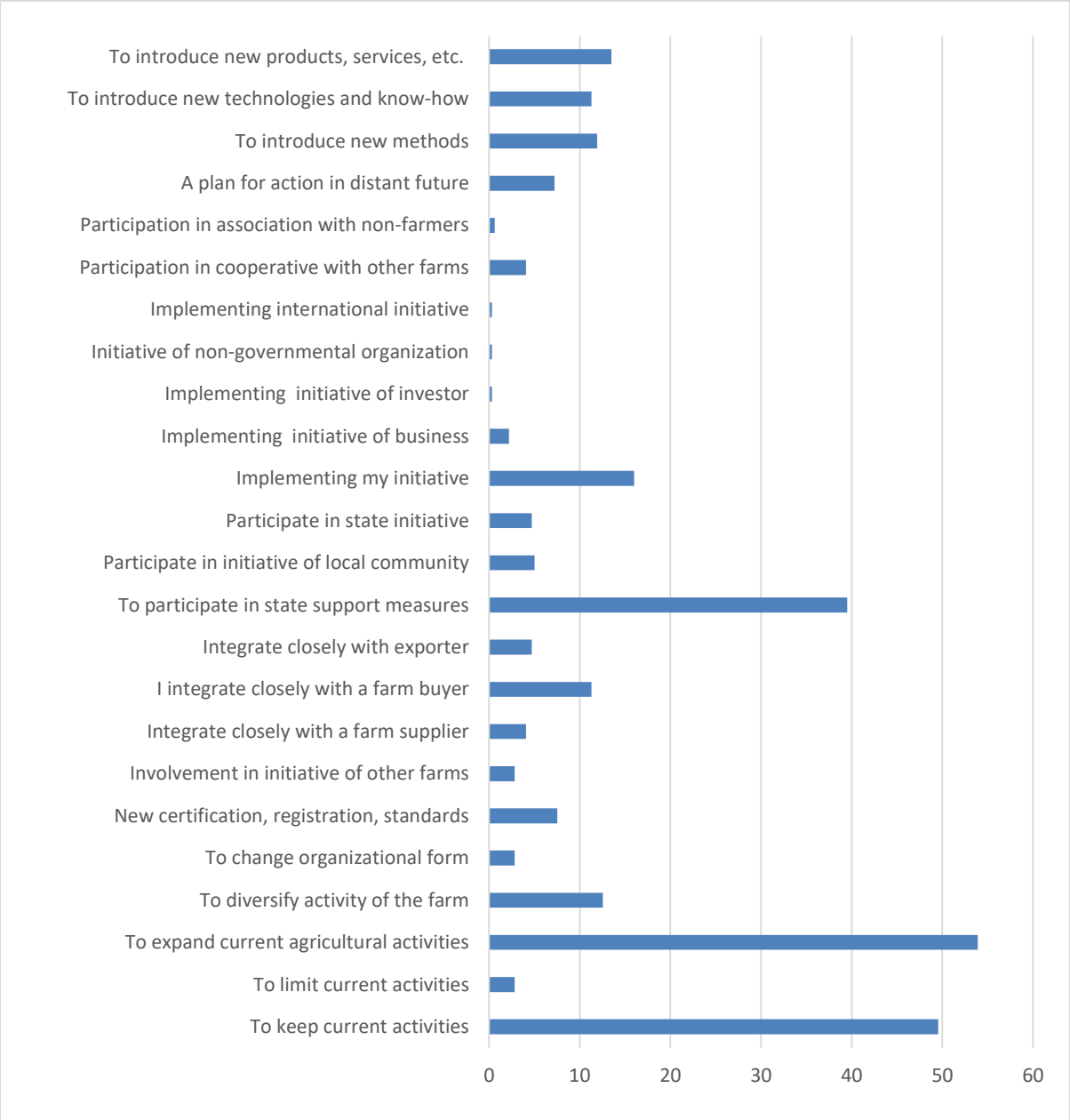
Source: Survey with agricultural producers, 2020

Regarding the intentions of the farms in the near future, the majority of managers plan to *expand the current agricultural activities* (53.92%), and a significant part to *keep the current activities* (49.53%) (Figure 23). Less than 3% of farms plan to *limit current activities*, which shows that the majority of Bulgarian farms have good competitive positions and plan to maintain or expand their activities.

A large part of the farms also intend to *participate in state support measures* (39.5%). Obviously, state support will continue to be an important factor in supporting and increasing the competitiveness of country's farms.

Other development strategies, which are also envisaged by a large number of farms, are: implementation of their initiative (15.99%), introduction of new products, services, etc. (13.48%), diversification of farm activity (12.54%), introduction of new methods (11.91%), integration closely with the buyer of the farm (11.29%), and introduction of new technologies and know-how (11.29%).

Figure 23. What are your intentions in the near future related to your farm (% of farms)?



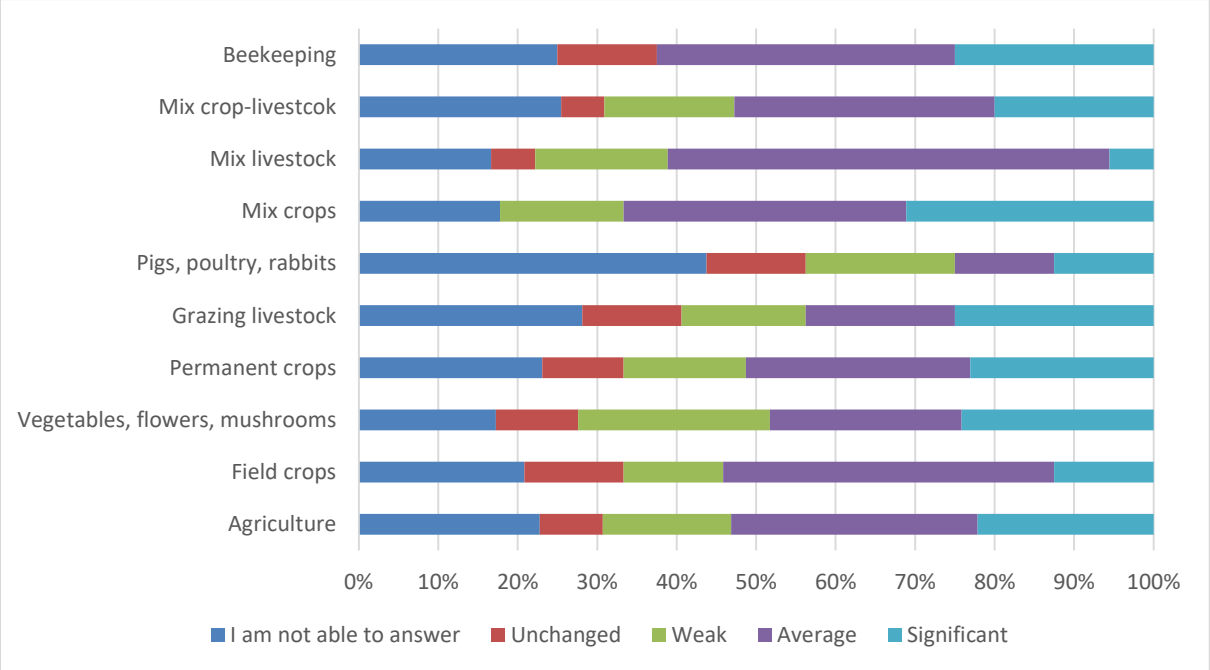
Source: Survey with agricultural producers, 2020

According to the majority of managers, when introducing an *innovative business model in agricultural management,* competitiveness will increase on average (31.01%) (Figure 24). For a relatively large part of the farms the introduction of such a model will significantly increase their competitiveness (22.15%), and the forecast for weak (16.14%) and no change (7.91%) makes less than the managers. At the same time, however, many managers cannot answer such a question (22.78%) due to the large uncertainties associated with the implementation of innovative models in the agricultural business.

Holdings with different specializations have different assessments of the likely effect on competitiveness from the introduction of an innovative business model for farm management. The majority of farms specializing in field crops (41.67%), perennials (28.21%), mixed crop (35.56%), mixed livestock (55.56%), mix crop-livestock (32.73%) and beekeeping (37.5%) expect an average increase in competitiveness. For the majority of farms specializing in grazing animals (28.13%), and pigs, poultry and rabbits (43.75%) on the other hand, it is difficult to make any predictions in this regard.

The largest share belongs to farms that expect a significant increase in their competitiveness after introduction of an innovative business model, in mixed crop production (31.11%), grazing animals and beekeeping (one in four), and vegetables, flowers and mushrooms (24.14%).

Figure 24. By introducing an innovative business model in the management of your farm, how will the competitiveness (% of farms) increase?



Source: Survey with agricultural producers, 2020

Conclusion

The multi-criteria assessment of the level of competitiveness of agricultural holdings in Bulgaria found that it is at a good level, as the low adaptive potential and economic efficiency contribute to the greatest extent to diminishing the competitiveness of local producers. Particularly critical for maintaining the competitive position of farms are low productivity, profitability, financial capability and adaptability to changes in the natural environment, in which areas should be directed public support for farms and their management development strategies.

More than a third of all farms in the country have a low level of competitiveness, and if timely measures are not taken to increase competitiveness by improving the management and restructuring of farms, adequate state support, etc., a large part of Bulgarian farms will cease to exist in the near future. The most competitive are the farms in the beekeeping sector, followed by field crops, mix livestock and mix crop production, and the lowest on the farms specializing in grazing animals.

The most significant factors for increasing the competitiveness of Bulgarian farms at current stage of development are market conditions (supply and demand, prices, competition), direct government subsidies, access to knowledge, advice and counseling, participation in government support programs, available information , financial opportunities, and opportunities for benefits in the near future.

The proposed approach to assessing the competitiveness of farms should be refined and applied more widely and periodically. The analyzes should also cover holdings of different legal type, size, ecological and geographical location, etc. The accuracy and representativeness of the information used should also be enhanced by increasing the number of surveyed farms, applying statistical methods, special "training" of those conducting and participating in the surveys, etc. All this requires closer cooperation with producer organizations, national agricultural advisory service and other stakeholders, and improvement of the system for collecting agricultural information in the country.

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