

**ABSOLUTE AND COMPARATIVE SUSTAINABILITY
 OF FARMING ENTERPRISES IN BULGARIA**

Evaluating absolute and comparative sustainability of farming enterprises is among the most topical issues for researchers, farmers, investors, administrators, politicians, interests groups and public at large. Nevertheless, in Bulgaria and most East European countries there are no comprehensive assessments on sustainability level of Bulgarian farms of different juridical type. This article applies a holistic framework and assesses absolute and comparative sustainability major farming structures in Bulgaria – unregistered farms of Natural Persons, Sole Traders, Cooperatives, and Companies. First, method of the study is outlined, and overall characteristics of surveyed farming enterprises presented. After that an assessment is made of integral, governance, economic, social, environmental sustainability of farming structures of different juridical type. Next, structure of farming enterprises with different sustainability levels is analyzed. Finally, conclusion from the study and directions for further research and amelioration of sustainability assessments suggested.

Key words: farm sustainability, governance, economic, social, ecological aspects, Bulgaria.

Introduction. The issue of assessment of absolute and comparative sustainability of farming structures of different type is among the most topical for researcher, farmers, investors, administrators, policy-makers, interests groups and public at large around the globe (Andreoli and Tellarini [1]; Bachev [2, 3, 4, 5, 6, 7]; Bachev and Petters [8]; Bachev et al. [9]; Bastianoni et al. [10]; EC [11]; FAO [12]; Fuentes [13]; Häni et al. [14]; OECD [15]; Rigby et al. [16]; Sauvenier et al. [17]; UN [18]). Nevertheless, practically there are no comprehensive assessments on sustainability level of Bulgarian farms of different juridical type in the conditions of European Union (EU) Common Agricultural Policy (CAP) implementation.

This article applies a holistic framework and assesses absolute and comparative sustainability of Bulgarian farming enterprises of different juridical type. First, method of the study is presented and overall characteristics of surveyed farms are outlined. After that, integral, governance, economic, social, and environmental sustainability of the farms of different juridical type is assessed. Finally, directions for further research and practices in sustainability assessment suggested.

Methods of the study. We have proved that definition farm sustainability has to be based on the "literal" meaning of that term and perceived as a system characteristics and "ability to continue through time" [3]. It has to characterize all major aspects of farming enterprise activity, which is to be managerially sustainable, and economically sustainable, and socially sustainable, and environmentally sustainable. Therefore, sustainability characterizes the ability (capability) of a particular farming enterprise to exist in time and maintain in a long-term its governance, economic, ecological and social functions in the specific socio-economic and natural environment in which it operates and evolves [6, 7].

In this study we apply a hierarchical framework including 12 Principles, 21 Criteria, 45 Indicators and Reference Values to assess sustainability level of Bulgarian farming structures (Fig. 1). The content, justification, modes of calculation and integration of sustainability indicators are already presented in details in our previous publication in this journal [7].

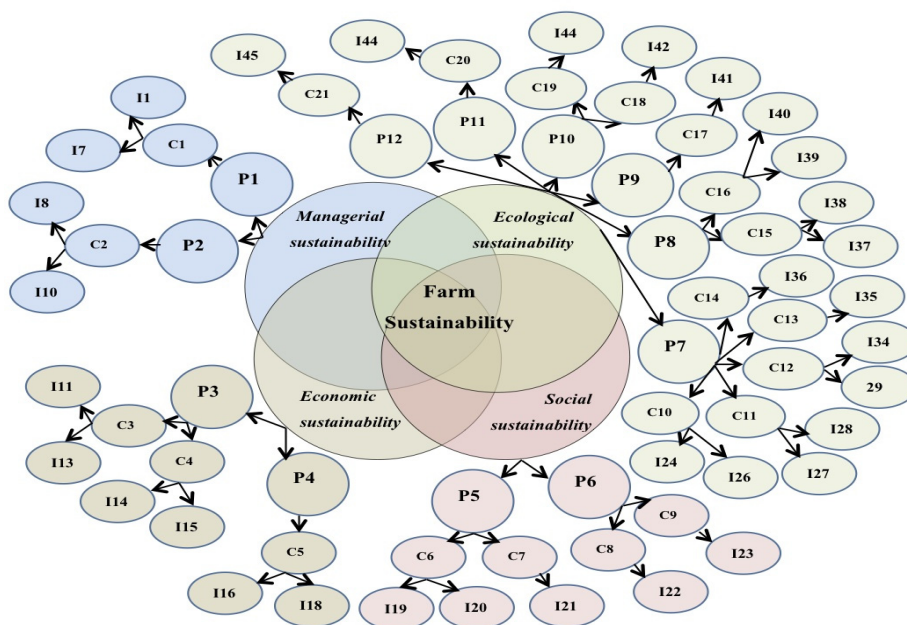


Fig. 1. Framework for Assessing Sustainability of Bulgarian Farms

Source: the author

Assessment of sustainability of farms in the country is based on a 2016 survey with the managers of "representative" market-oriented farms of different type. The survey was carried out with the assistance of the National Agricultural Advisory Service and the major associations of agricultural producers in the country, which identified the "typical" holdings of different type and location.

Assessment of sustainability level of individual farm is based on estimates of the managers for each Indicator in four qualitative levels: "High/Higher or Better than the Average in the Sector/Region", "Similar/Good", "Low/Lower or Worse than the Average in the Sector/Region", "Negative/Unsatisfactory/Unacceptable". After that the qualitative estimates for individual farms were quantified and transformed into Sustainability Indexes for each Indicator ($SI(i)$) using following scales: 1 for "High", 0,66 for "Good or Average", 0,33 for "Low", and 0 for "Unsatisfactory or Unacceptable".

For classification of farms according to juridical type (Physical Person, Sole Trader, Cooperative, Company), production specialization (Field Crops, Vegetables, Flowers, and Mushrooms, Permanent Crops, Grazing Livestock, Pigs, Poultry, and Rabbits, Mix Crop-Livestock, Mix Crops, Mix Livestock), geographical and administrative regions (North-West Region, North-Central Region, North-East Region, South-West Region, South-Central Region, South-East Region), and ecological locations (Mountainous or Non-mountainous regions with Natural Handicaps, with Lands in Protected Zones and Territories) the official typology for farming holdings in the country is used. In addition, every manager self-determined his/her farm as Predominately for Subsistence, rather Small, Middle size or Large for the sector, and located mainly in Plain, Plain-mountainous or Mountainous region. The latter approach guarantees an adequate assessment since the farms man-

agers are well aware of the specificity and comparative characteristics of their holdings in relations to others in the region and the (sub)sector.

For the integral assessment of sustainability of a farm for every Criteria, Principle, and Aspect, and Overall level, equal weights are used for each Principle in a particular Aspect, and for each Criterion in a particular Principle, and for each Indicator in a particular Criterion. Sustainability Index for individual Criteria ($SI(c)$), Principle ($SI(p)$), and Aspect ($SI(a)$), and Integral Sustainability Index ($SI(i)$) are calculated by formulas:

$$SI(c) = \sum SI(i)/n$$

n – number of Indicators in a particular Criteria

$$SI(p) = \sum SI(c)/n$$

n – number of Criteria in a particular Principle

$$SI(a) = \sum SI(p)/n$$

n – number of Principles in a particular Aspect

$$SI(i) = \sum SI(a)/4$$

The survey with the farm managers took part in summer of 2016 and included 190 registered agricultural producers, which comprise around 0,2 % of all registered under 1999 Regulation No 3 for Creation and Maintaining a Registry of Agricultural Producers in Bulgaria (Agrarian paper, 2015).

Managers of "representative" farms of all juridical type, size, specialization and location have were surveyed. (Table 1). The structure and importance of surveyed farms approximately corresponds to the real structure of registered agricultural producers and market-oriented holdings in the country.

Table 1. Type and Number of Surveyed Agricultural Farms (percent, number**)

Type and location of farms	Physical persons	Sole Traders	Cooperatives	Companies	Total
Total	80,00	4,21	6,84	8,95	190*
Mainly subsistence	11,18	0,00	0,00	0,00	8,95
Small size	57,89	37,50	0,00	5,88	48,42
Middle size	28,95	37,50	92,31	70,59	37,37
Big size	1,32	25,00	7,69	23,53	4,74
Field crops	10,53	25,00	69,23	29,41	16,84
Vegetables, flowers, and mushrooms	13,82	12,50	0,00	0,00	11,58
Permanent crops	24,34	25,00	0,00	11,76	21,58
Grazing livestock	17,76	25,00	0,00	5,88	15,79
Pigs, poultry, and rabbits	0,66	0,00	7,69	0,00	1,05
Mix crop-livestock	14,47	0,00	23,08	23,53	15,26
Mix crops	13,82	12,50	0,00	29,41	14,21
Mix livestock	4,61	0,00	0,00	0,00	3,68
Mainly plain region	51,97	50,00	53,85	64,71	53,68
Plain-mountainous	19,74	50,00	38,46	17,65	22,11
Mainly mountainous	14,47	0,00	7,69	17,65	13,68
Lands in protected zones and territories	6,58	0,00	0,00	17,65	6,84
Mountainous regions with natural handicaps	15,13	0,00	7,69	11,76	13,68
Non-mountainous regions with natural handicaps	1,97	0,00	7,69	0,00	2,11
North-West region	15,79	37,50	7,69	11,76	15,79
North-Central region	21,05	0,00	23,08	23,53	20,53
North-East region	15,13	12,50	38,46	11,76	16,32
South-West region	14,47	0,00	7,69	11,76	13,16
South-Central region	19,74	12,50	15,38	29,41	20,00
South-East region	13,82	37,50	7,69	11,76	14,21

** mainly Corporations and 5,88 % Partnerships.

Source: survey with managers of farms, July 2016

Results and Discussion. Multi-indicators assessment of sustainability level of surveyed farms indicates, that the Index of Integral Sustainability of holdings is 0,55, which

represents a *good* level of sustainability of Bulgarian farms (Fig. 1). With the highest levels are Indexes of Environmental (0,61) and Social (0,57) Sustainability of holdings,

while Indexes of Governance (0,52) and Economic (0,5) Sustainability are at the border with a low level. Therefore,

improvement of the latter two is critical for maintaining a good sustainability of farming enterprises in the country.

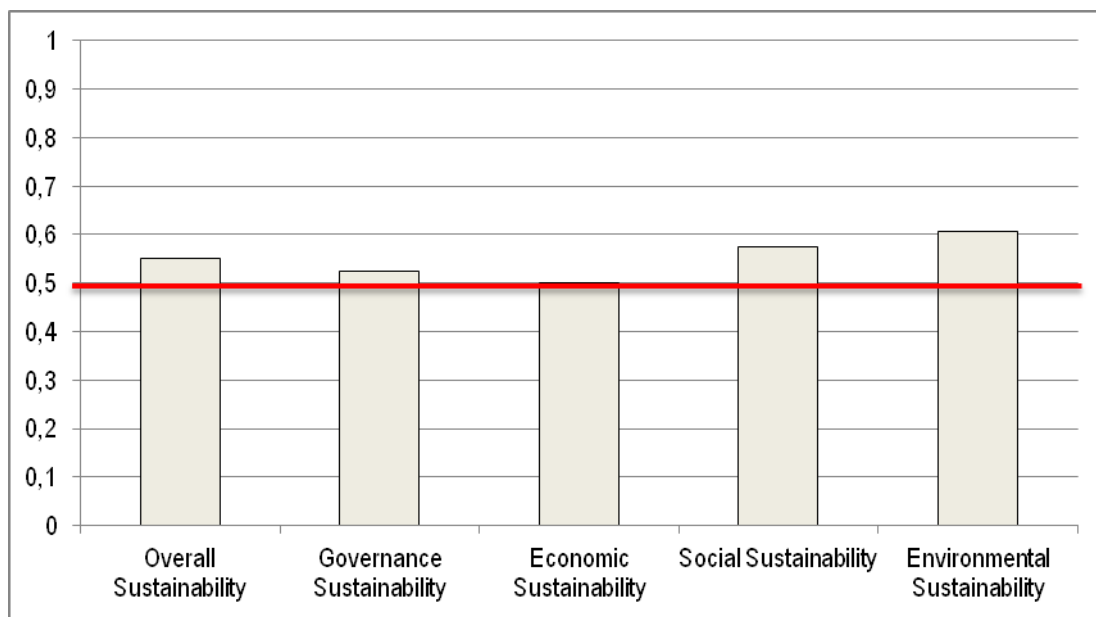


Fig. 1. Indexes of Integral, Governance, Economics, Social and Environmental Sustainability of Bulgarian Farms

Source: survey with managers of farms, July 2016

Analysis of individual Indexes for major sustainability Principles, Criteria and Indicators let identify components contributing to diverse aspects of farms' sustainability in the country. For instance, governance and economic sustainability of Bulgarian farms are relatively low because of the fact that the Index of Governance Efficiency (0,49) and

the Index of Financial Stability (0,47) of holdings are low (Fig. 2). Similarly, it is clear that despite that the overall environmental sustainability is relatively high, the Index of Preservation of Agricultural Lands (0,52) and the Index of Preservation of Biodiversity (0,56) are relatively low and critical for maintaining the achieved level.

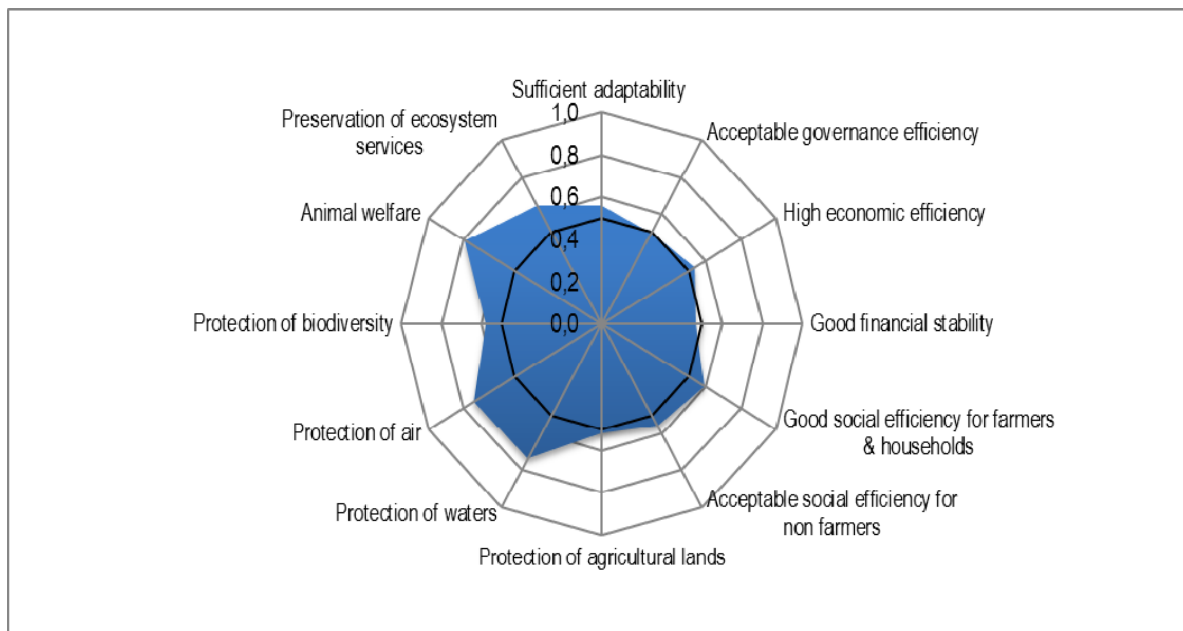


Fig. 2. Index of Sustainability of Bulgarian Farms for Major Principles for Governance, Economics, Social and Environmental Sustainability

Source: survey with managers of farms, July 2016

In depth analysis for individual Criteria and Indicators further specifies the elements, which enhance or reduce farms' sustainability level. For instance, insufficient Comparative Governance Efficiency and Financial Capability (Fig. 3) are determined accordingly by: a low Comparative Efficiency of Supply of Short-term Inputs in relations to alternative organizations (0,28), and unsatisfactory Profit-

ability of Own Capital (0,41) and Overall Liquidity (0,48) of farms (Fig. 4). Similarly, low levels of Indexes of Preservation of Agricultural Lands and Preservation of Biodiversity are determined accordingly by insufficient Application of Recommended Irrigation Norms (0,46), high level of Soils Water Erosion (0,55), and lowered Number of Wild Animals on Farm Territory (0,53).

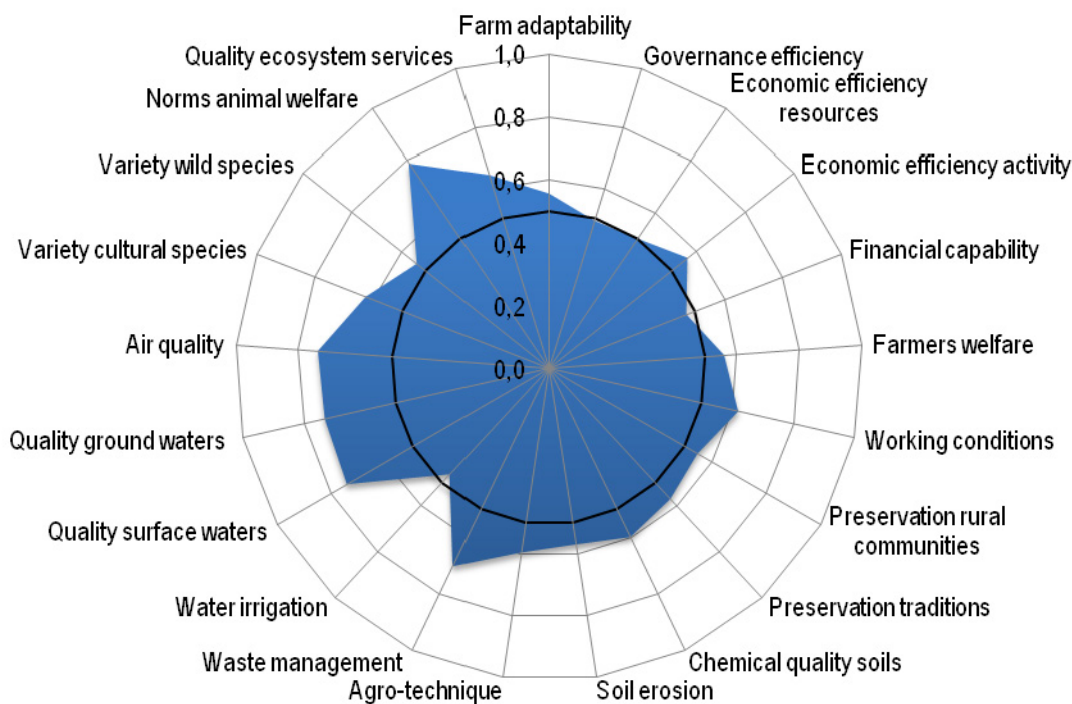
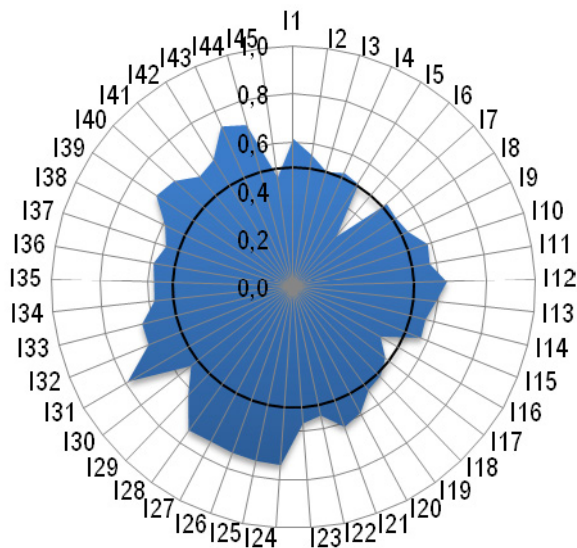


Fig. 3. Level of Sustainability of Bulgarian Farms for Individual Criteria for Governance, Economics, Social and Environmental Sustainability

Source: survey with managers of farms, July 2016



**I1-Level of Adaptability to Market Environment; I2-Level of Adaptability to Institutional Environment; I3-Level of Adaptability to Natural Environment; I4-Comparative Efficiency of Supply and Governance of Labor Resources; I5-Comparative Efficiency of Supply and Governance of Natural Resources; I6-Comparative Efficiency of Supply and Governance of Short-term inputs; I7-Comparative Efficiency of Supply and Governance of Long-term Inputs; I8-Comparative Efficiency of Supply and Governance of Innovation; I9-Comparative Efficiency of Supply and Governance of Finance; I10-Comparative Efficiency of Governance of Marketing of Products and Services; I11-Land productivity; I12-Livestock Productivity; I13-Level of Labor productivity; I14-Rate of Profitability of Production; I15-Income of Enterprise; I16-Rate of Profitability of Own Capital; I17-Overall Liquidity; I18-Financial Autonomy; I19-Income per Farm-household Member; I20-Satisfaction of Activity; I21-Compliance with Working Conditions Standards; I22-Contribution to Preservation of Rural Communities; I23-Contribution to Preservation of Traditions; I24-Nitrate Content in Surface Waters; I25-Pesticide Content in Surface Waters; I26-Nitrate Content in Ground Waters; I27-Pesticide Content in Ground Waters; I28-Extent of Air Pollution; I29-Number of Cultural Species; I30-Number of Wild Species; I31-Extent of Respecting Animal Welfare; I32-Extent of Preservation of Quality of Ecosystem Services; I33-Soil Organic Content; I34-Soil Acidity; I35-Soil Soltification; I36-Extent of Wind Erosion; I37-Extent of Water Erosion; I38-Crop Rotation; I39-Number of Livestock per ha of Farmland; I40-Norm of Nitrogen Fertilization; I41-Norm of Phosphorus Fertilization; I42-Norm of Potassium Fertilization; I43-Extent of Application of Good Agricultural Practices; I44-Type of Manure Storage; I45-Irrigation Rate

Fig. 4. Indicators* of Assessing Sustainability of Bulgarian Farms

Source: survey with managers of farms, July 2016

Low levels of indicators identify the specific areas for improvement of sustainability of farms through adequate changes in management strategy and/or public policies. For instance, despite that the overall Adaptability of Farms is relatively high (0,56), the Adaptability of Farms to Changes in Natural Environment (climate, extreme events, etc.) is relatively low (0,5). Therefore, effective measures are to be undertaken to improve the latter type of adaptability through education, training, information, amelioration of agro-techniques, structure of production and varieties, technological and organizational innovations, etc.

On the other hand, superior levels of certain indicators show the absolute and comparative advantages of Bulgarian farms related to sustainable development. At the current stage of development the latter are associated with respecting Animal Welfare standards, Preservation of Quality of Surface and Ground Waters from contamination with nitrates and pesticides, Preservation of Air Quality, implementation of Good Agricultural Practices, reduced Number of Livestock per unit of Farmland, acceptable Labor Conditions and comparative Satisfaction from Farming Activity, optimal Productivity of Livestock, good Adaptability to Market (prices, competition, demands), and Comparative Governance Efficiency of Marketing of Products and Services.

There is a great variation in levels of individual sustainability indicators for farms of different juridical type (Fig. 5).

Most sustainability indicators of Physical Persons are low and lead to a decrease in sustainability for individual aspects and overall sustainability. In governance aspect of

sustainability of these enterprises are low: Level of Adaptability to Natural Environment (0,49), and Comparative Efficiency of Supply and Governance of Labor Resources (0,49), Natural Resources (0,49), Long-term Inputs (0,48) and Innovations (0,49), and extremely low Comparative Efficiency of Supply and Governance of Short-term Inputs (0,26). In the economics aspect sustainability of Physical Persons is particularly low in respect to Livestock Productivity (0,34), Rate of Profitability of Own Capital (0,36), Overall Liquidity (0,44), and Financial Autonomy (0,48). In social perspective sustainability of these enterprises is only low in relation to Income per Farm-household Member (0,49) while in environmental plan in respect to complying with norms for Number of Livestock per ha (0,39), Type of Manure Storage (0,39), Extent of Respecting Animal Welfare (0,43) and Irrigation Rate (0,49). In all these directions adequate measures have to be undertaken by managers and state authority in order to improve aspect and overall sustainability of that type of farms.

At the same time, a number of indicators for environmental sustainability of Physical Persons are with relatively high positive positions within the good level: Nitrate and Pesticides Content in Surface and Ground Waters, Extent of Air Pollution, and Extent of Application of Good Agricultural Practices. All these advantages of Physical Persons are to be maintained and enhanced, while other indicators for eco-efficiency increased in order to preserve and increase aspect and overall sustainability of these types of holdings.

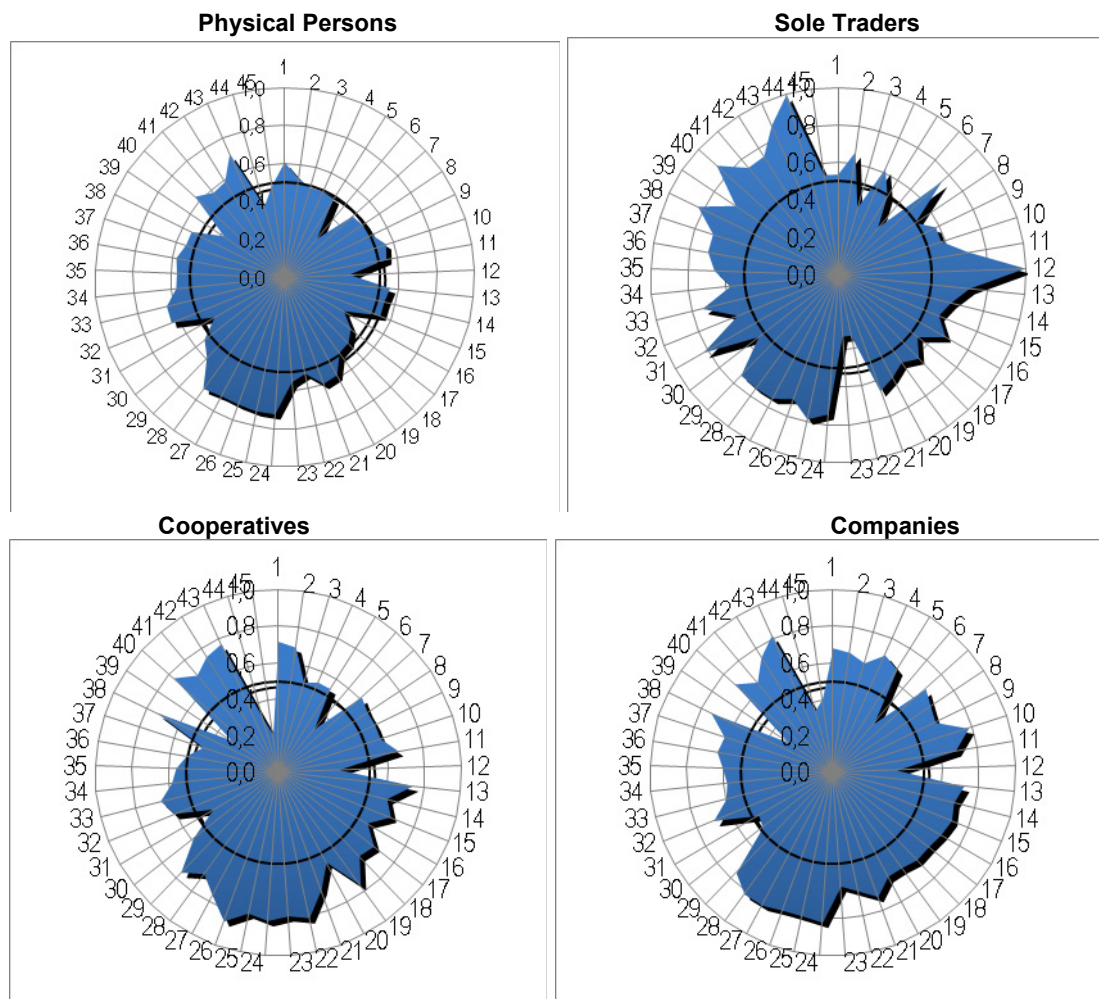


Fig. 5. Sustainability Indicators of Farms of Different Juridical Type in Bulgaria

Source: survey with farm managers, July 2016

Sole Traders are with low values for governance sustainability in respect to Level of Adaptability to Natural Environment (0,37) and Comparative Efficiency of Supply and Governance of Short-term inputs (0,33), and for social sustainability in respect to their Contribution to Preservation of Rural Communities and Preservation of Traditions (by 0,33).

Simultaneously, Sole Traders have high sustainability for eco-aspects of activity in relation to Type of Manure Storage, Norm of Nitrogen Fertilization, and Extent of Application of Good Agricultural Practices, and marginal to the highest level for implementation of effective Crop Rotation. What is more, enterprises with livestock are with a high sustainability for Livestock Productivity as well as a marginal to the highest level for Extent of Respecting Animal Welfare Standards. Furthermore, many indicators for environmental sustainability of Sole Traders are with high positive values within the borders of good level: Nitrate and Pesticides Content in Surface and Ground Waters, Extent of Air Pollution, Number of Cultural Species, Soil Organic Content, Extent of Wind and Water Erosion, and application of recommended Norms of Potassium and Phosphorus Fertilization. Sole Traders are also with a high position, within the borders of a good level, for Comparative Efficiency of Supply and Governance of Long-term Inputs, Level of Labor Productivity, and Land Productivity. All that also contributes to a growth in their governance and economic sustainability.

For Cooperatives, in the borders of a good sustainability level, the highest indicators values are for governance, social and economic sustainability: Level of Adaptability to Market Environment, Level of Labor Productivity, Income per Farm-household Member, Contribution to Preservation of Rural Communities and Preservation of Traditions. Numerous of the environmental indicators of cooperative enterprises are also with superior levels – a high eco-sustainability for Nitrate Content in Ground Waters, and a good eco-sustainability for Nitrate and Pesticide Content in Surface Waters, Pesticide Content in Ground Waters, Number of Cultural Species, Extent of Application of Good Agricultural Practices, efficient Crop Rotation, and application of Norms of Nitrogen and Phosphorus Fertilization. All these positive aspects of the activity of Cooperative enterprises are to be maintained and expended.

On the other hand, Cooperatives are environmentally unsustainable in respect to Irrigation Rate (0,2) and with low levels for Comparative Efficiency of Supply and Governance of Short-term Inputs (0,3), Livestock Productivity (0,33), required Number of Livestock per ha (0,31), Type of Manure Storage (0,31), Extent of Respecting Animal Welfare (0,41), and Extent of Water Erosion (0,43). These parts of Cooperatives' activity have to be considerably improved in order to increase governance, economic, environmental and integral sustainability of these enterprises.

For Companies, within the borders of a good sustainability, the highest are levels for indicators of governance sustainability: Comparative Efficiency of Supply and Governance of Labor Resources, and Comparative Efficiency of Governance of Marketing of Products and Services. In respect to economic sustainability the best levels are for Labor Productivity and Income of Enterprise, while for social sustainability for Compliance with Working Conditions Standards. For environmental suitability superior are indicators for Nitrate and Pesticides Content in Surface and Ground Waters, Extent of Air Pollution, Extent of Application of Good Agricultural Practices, efficient Crop Rotation, Number of Cultural Species, application of Norms of Nitrogen and Phosphorus Fertilization, and Extent of Preservation of Quality of Ecosystem Service.

With the lowest values for Companies are indicators for governance and economic sustainability: Comparative Efficiency of Supply and Governance of Short-term Inputs (0,35) and Livestock Productivity (0,35), and indicators for eco-sustainability: permissible Number of Livestock per ha (0,29), Type of Manure Storage (0,35), Extent of Respecting Animal Welfare (0,41), Irrigation Rate (0,41) and Number of Wild Species on the Territory of Farm (0,49). These sides of activity of corporative enterprises have to be improved in order to increase their governance, economic, environmental and integral sustainability.

Holding of Physical Persons are the most numerous and to a great extent they (pre)determine the "average" sustainability level of all farms in the country. Consequently, the level of integral sustainability of Physical Persons of different type deviates insignificantly from the average sustainability levels of respective categories in the country (Fig. 6).

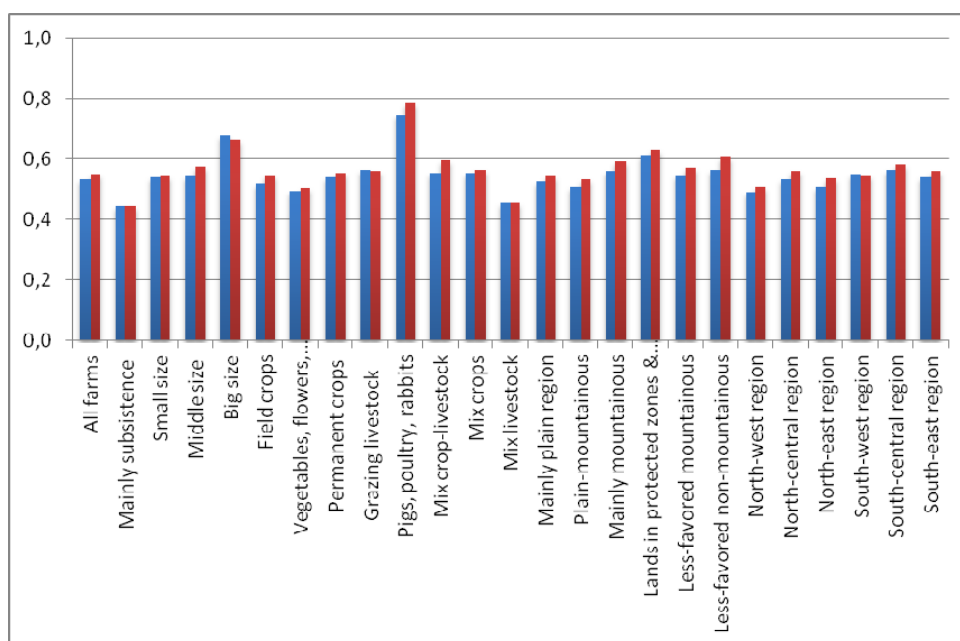


Fig. 6. Levels of Sustainability of Holdings of Physical Persons of Different Type in Bulgaria

Source: survey with managers of farms, July 2016

There are significant variations in sustainability of Physical Persons depending on their size, specialization, ecological and geographical location. That indicates that the size, product specialization and location of Physical Persons are more important factors for their sustainability than their juridical status.

With the best sustainability, within a good level, are holdings of Physical Persons with Big size, specialized in Pigs, poultry and Rabbits, these with Lands in Protected Zones and Territories, and located in the South-Central region of the country. At the same time, with low sustainability are Physical Persons which are Predominately for Subsistence, those specialized in Mix-Livestock and in Vegetables, Flowers and Mushrooms, and located in the North-West region of the country. According to the ecological location, the lowest (within a good level) is sustainability of Physical Persons situated in Plain-mountainous regions of the country.

There is also a significant differentiation in the share of farms with different level of sustainability for the major type of Physical Persons (Fig. 7). All Physical Persons with Big size for the sector and specialized in Pigs, poultry and Rabbits, and most of these in Mix Cops and Permanent Crops, and located in Non-mountainous Regions with Natural Handicaps and with Lands in Protected Zones and Territories are with a good and a part with a high sustainability. On the other hand, majority of Physical Persons, which are Predominately for Subsistence and these with Mix Livestock are with low sustainability or unsustainable. The portion is also considerable of low sustainable or unsustainable Physical Persons in groups with Vegetables, Flowers and Mushrooms, Grazing Livestock, and Crop-Livestock specialization, those located in Mountainous Regions with Natural Handicaps, in Plain-Mountainous Regions, and in NorthWest and South-Wets Regions of the country.

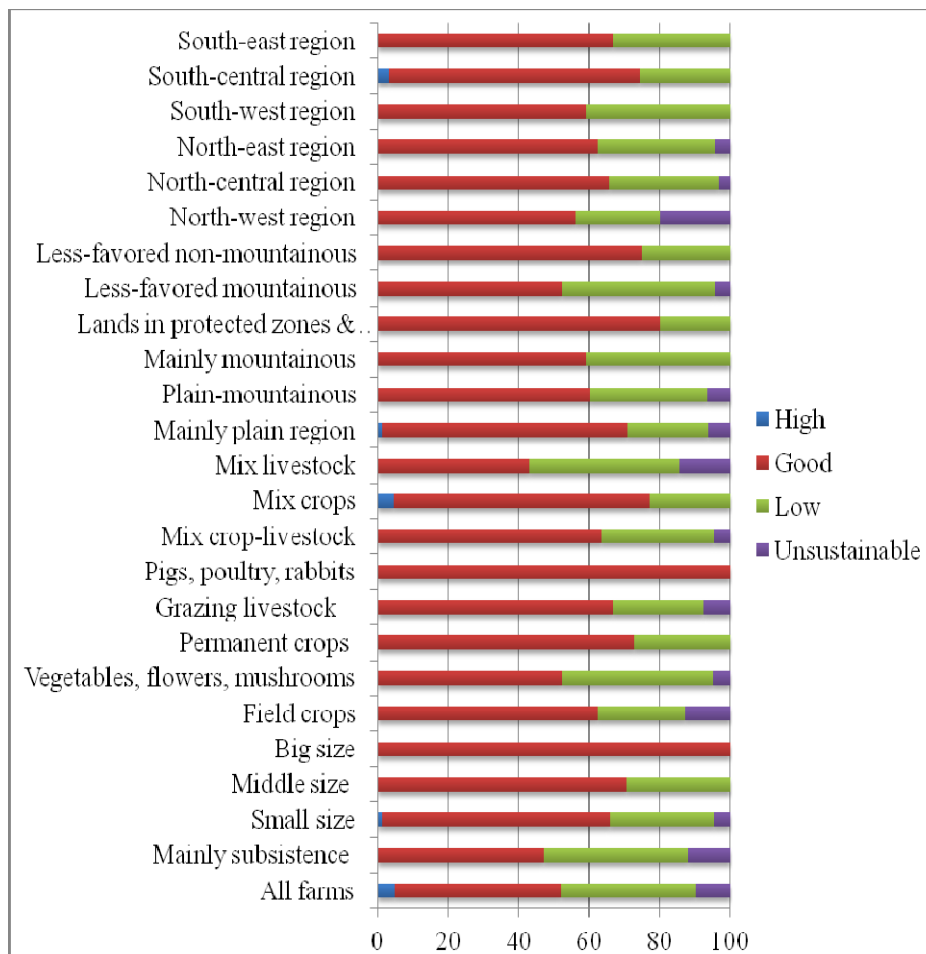


Fig. 7. Structure of Physical Persons of Various Type with Different Sustainability Level in Bulgaria (percent)

Source: survey with managers of farms, July 2016

For Sole Traders there is also variation in sustainability level dependent on size, specialization, ecological and geographical location. With the highest sustainability are Sole Traders with Big size for the sector, specialized in Vegetables, Flowers and Mushrooms, and located in Plain regions, and in South-Central region of the country

(Fig. 8). Simultaneously, with a low sustainability are Sole Traders specialized in Mix Crops and in Grazing Livestock, and in the border with the inferior level those with Small size, and located in Plain-mountainous and North-West region of the country.

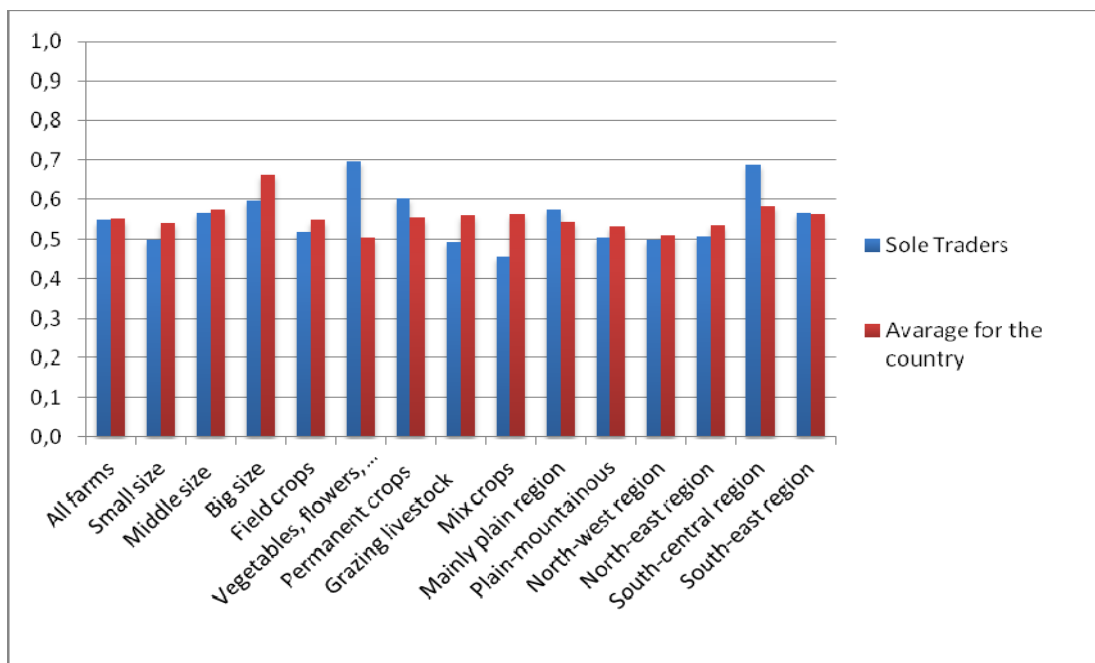


Fig. 8. Levels of Sustainability of Sole Traders of Different Type in Bulgaria

Source: survey with managers of farms, July 2016

In Sole Traders' groups with the lowest and the highest sustainability levels there are significant deviations from the average levels of sustainability in respective categories of farms in the country. That demonstrates that the specific juridical status of Sole Trader is a critical (and more important) factor determining the level of sustainability in this group, rather than belonging of holdings to a certain type. On the other hand, in other groups of Sole Traders the levels of sustainability are close to the average in the country, which shows that for these Sole Trades the size, specialization and location are dominating for formation of one of another sustainability level.

There are significant variations in the share of Sole Traders of different type with unlike sustainability levels (Fig. 9). All farms with Big size, specialized in Field Crops, Vegetables, Flowers and Mushrooms, Permanent Crops, and those located in North-East and South-Central Regions of the country are with a good sustainability. On the other hand, all holdings with Mix Crops, every other specialized in Grazing Livestock, and one third of these with Small and Middle size as well as situated in North-West and South-East Regions of the country are low sustainable.

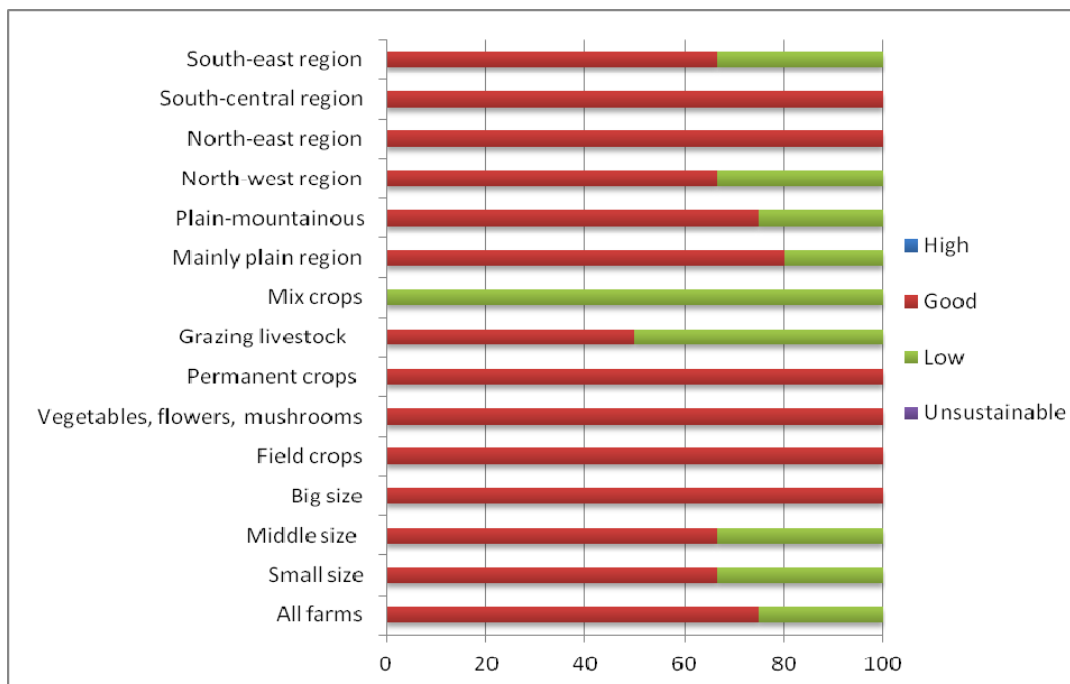


Fig. 9. Structure of Sole Traders of Various Type with Different Sustainability Level in Bulgaria (percent)

Source: survey with managers of farms, July 2016

For Cooperatives there exists considerable differentiation in sustainability level depending on the size, specialization and location of the farms. With the best sustainability (close to the border with a high level) are cooperatives with Big size for the sector, those specialized in Pigs, Poultry

and Rabbits, located in Mountainous regions, Mountainous Regions with Handicaps, and in North-Central region of the country (Fig. 10). With the lowest sustainability are cooperatives located in South-West region of the country.

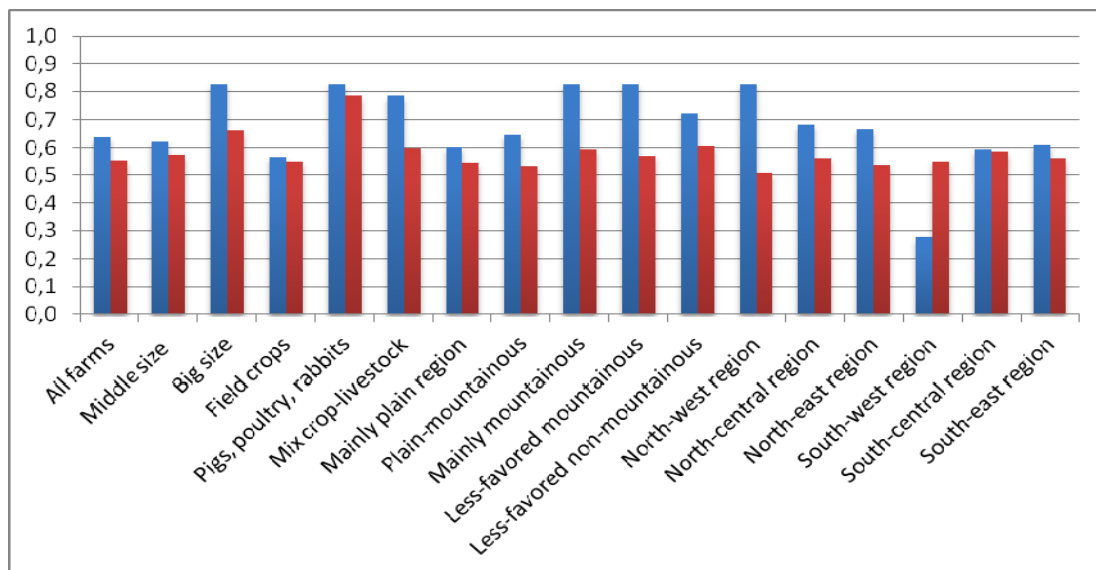


Fig. 10. Levels of Sustainability of Cooperatives of Different Type in Bulgaria

Source: survey with managers of farms, July 2016

The levels of sustainability of most Cooperatives of different type deviate considerably from the average levels for sustainability in these groups of holdings in the country. That proves that specific "Cooperative forms" (the juridical status of Cooperative) is critical factor determining sustainability levels of cooperative farms of a particular type, rather than their belonging to certain category of holdings in the country.

There are significant variations in the share of Cooperatives with different sustainability level for individual type of farms (Fig. 11). All Cooperatives with Big size, specialized

in Pigs, Poultry and Rabbits, Crop-Livestock, and those located in Mountainous Regions, Mountainous and Non-mountainous Regions with Natural Handicaps, and in North-West, North-Central, South-Central and South-East Regions of the country are with a good sustainability. The greatest portion of highly sustainable Cooperatives are among located in North-East Region, and Plain Regions of the country as well as specialized in Field Crops. At the same time, each of Cooperatives in South-West Region and 40 % of located in Plain-Mountainous Regions of the country are low sustainable.

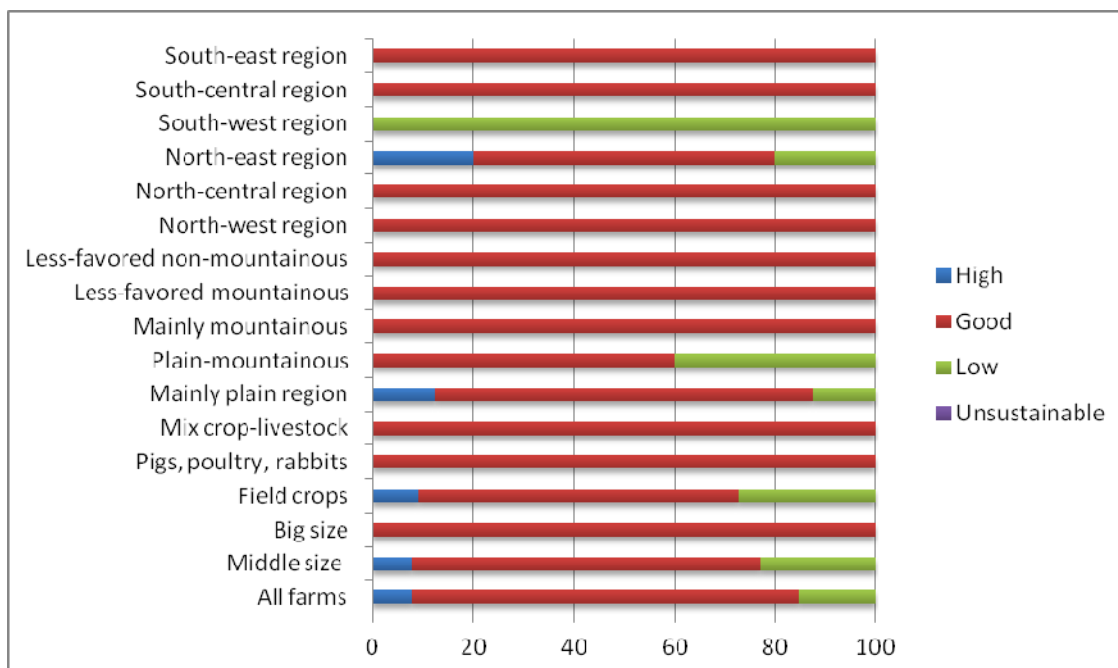


Fig. 11. Structure of Cooperatives of Various Type with Different Sustainability Level in Bulgaria (percent)

Source: survey with managers of farms, July 2016

There are a significant specificity and variation in sustainability levels of Companies with different size, specialization and location (Fig. 12). With the highest sustainability are Companies with Small size for the sector, specialized in Permanent crops, located in Mountainous regions, and in South-East region of the country. Simultaneously, farms of that juridical type specialized in Grazing Livestock, and located in North-West region of the country are with the lower levels of sustainability.

There are great elevations in sustainability levels of Companies of all type with an exception of firms with Big size for the sector, specialized in Grazing Livestock, and located in North-East Region of the country. That means that for most categories of Companies the specific juridical

status is critical for one or another level of sustainability. Sole exceptions are mentioned above three groups of firms, where belonging to farms with a particular (Big) size, specialization (Grazing Livestock) and location (North-East Bulgaria) is an important factor for sustainability formation.

In Companies also there is a great differentiation in fractions of holdings with one or another level of sustainability in each particular group (Fig. 13). All farms with Crop-Livestock specialization, and those located in Mountainous Regions in Natural Handicaps as well as the vast majority of those with Big size for the sector and Mix Crops are highly sustainable. At the same time, a half of the Companies in North-West Region of the country and every third of those in South-West Region are low sustainable.

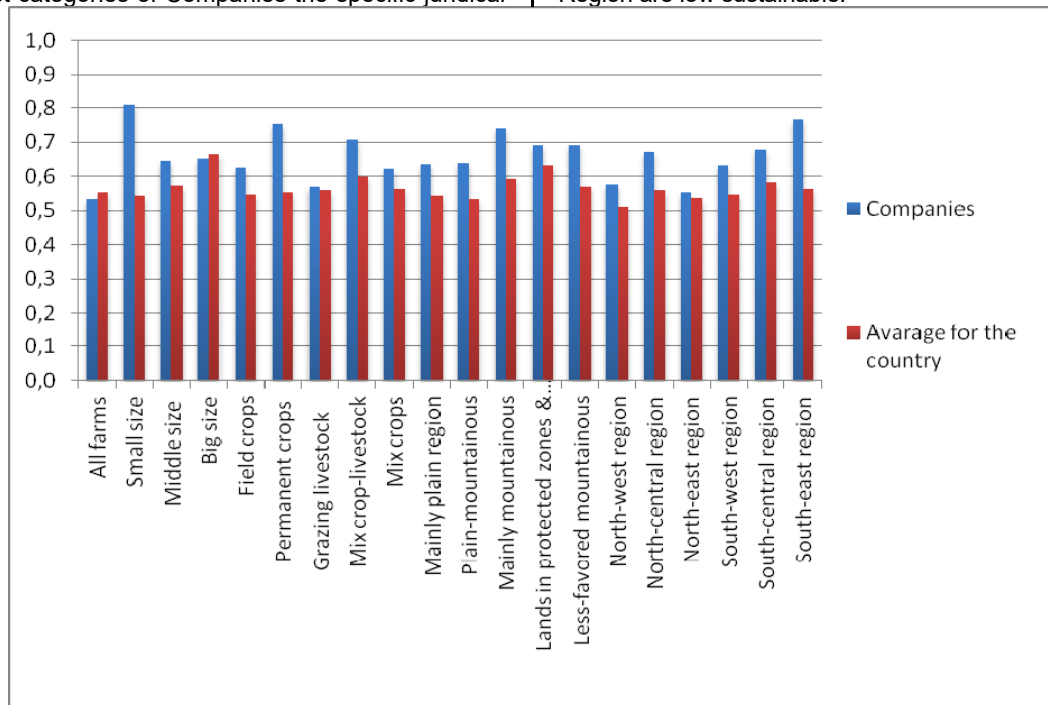


Fig. 12. Levels of Sustainability of Companies of Different Type in Bulgaria

Source: survey with managers of farms, July 2016

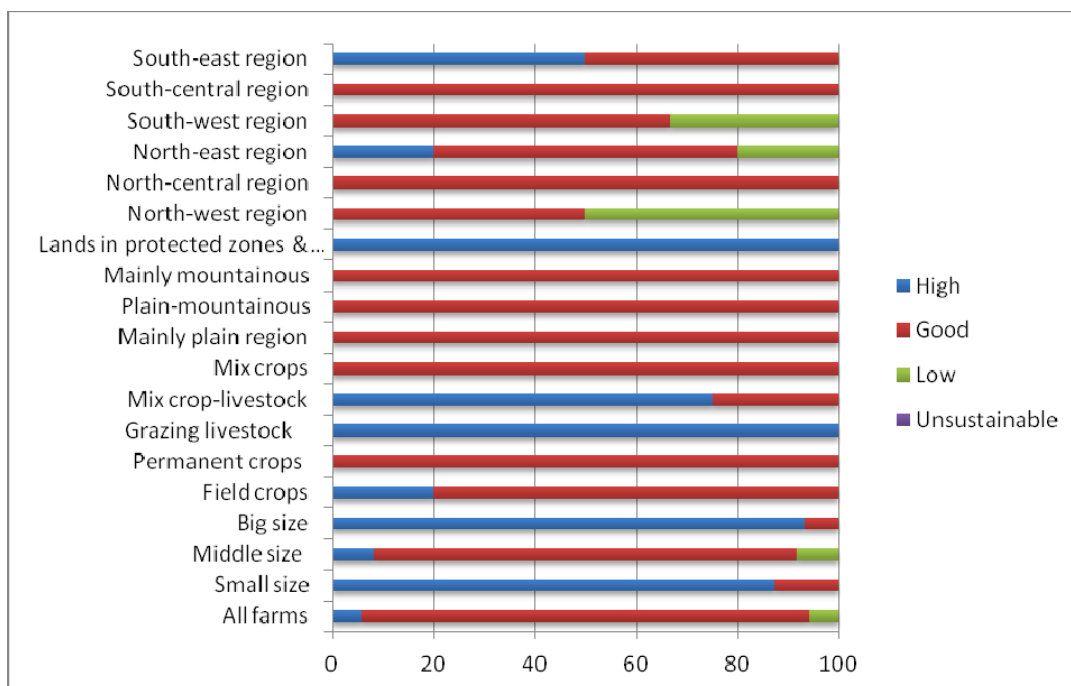


Fig. 13. Structure of Companies of Various Type with Different Sustainability Level in Bulgaria (percent)

Source: survey with managers of farms, July 2016

Conclusion. Our survey includes "typical" and to a certain extent "sustainable" (perspective) agricultural farms, which means that sample sustainability level is higher than the real (average) for the country. Despite that undertaken first large-scale study on sustainability of Bulgarian farming structures let us make some important conclusions about the level of holdings sustainability in the country, and recommendations for managerial and assessment practices.

Suggested holistic framework gives a possibility to improve assessment, analysis and management of sustainability of individual farms and holdings of different type in general and for major aspects, principles, criteria and indicators of governance, economic, social and environmental sustainability. That approach has to be further discussed, experimented, improved and adapted to the specific conditions of operation and development of farms of different type, subsector of production, geographical region and ecosystem as well as the special needs of decision-makers at various levels.

Overall sustainability of Bulgarian farms is at a good level, with superior levels for environmental and social sustainability, and inferior level for governance and economic sustainability. There are great variations in sustainability levels of farms of different juridical type as well as in shares of holdings with unlike level of sustainability. Distribution of farms of different type in groups with diverse levels of sustainability has to be taken into account when forecast the number and importance of holdings of each kind, and modernize public (structural, sectorial, regional, environmental, etc.) policies for supporting agricultural producers of certain type, sub-sectors, ecosystems and regions of the country.

Having in mind the importance of holistic assessments of sustainability of farms and the enormous benefits for farm management and agrarian policies, such studies are to be expanded and their precision and representation increased. The latter require a close cooperation between all interests parties and participation of farmers, agrarian organizations, local and state authorities, interest groups, research institutes and experts, etc. Moreover, the precision of estimates has to be improved and besides on assessments of managers to incorporate relevant information from field tests and surveys, statistical and other data, and expertise of professionals in the area.

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АБСОЛЮТНА І ПОРІВНЯЛЬНА СТІЙКІСТЬ СІЛЬСЬКОГОСПОДАРСЬКИХ ПІДПРИЄМСТВ У БОЛГАРІЇ

Оцінка абсолютної і порівняльної стійкості сільськогосподарських підприємств є одним із найактуальніших питань для дослідників, фермерів, інвесторів, адміністраторів, політиків, зацікавлених груп і населення загалом. Проте в Болгарії і більшості країн Східної Європи не існує комплексних оцінок рівня стійкості болгарських ферм різного юридичного типу. У статті оцінено абсолютні і порівняльні показники стійкості основних сільськогосподарських структур у Болгарії – незареєстровані ферми фізичних осіб, індивідуальних підприємств, кооперативів та компаній. Викладено метод дослідження і представлені загальні характеристики обстежених сільськогосподарських підприємств. Після цього проведено інтегральну оцінку управління, економічної, соціальної, екологічної стійкості сільськогосподарських споруд різного юридичного типу. Проаналізовано структуру сільськогосподарських підприємств із різними рівнями стійкості. Запропоновано висновок із дослідження і напрями для подальших розвідок і поліпшення оцінок стійкості.

Ключові слова: стійкість ферми, управління, економічні, соціальні та екологічні аспекти, Болгарія.

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АБСОЛЮТНАЯ И СРАВНИТЕЛЬНАЯ УСТОЙЧИВОСТЬ СЕЛЬСКОХОЗЯЙСТВЕННЫХ ПРЕДПРИЯТИЙ В БОЛГАРИИ

Оценка абсолютной и сравнительной устойчивости сельскохозяйственных предприятий является одним из наиболее актуальных вопросов для исследователей, фермеров, инвесторов, администраторов, политиков, заинтересованных групп и населения в целом. Однако в Болгарии и большинстве стран Восточной Европы не существует комплексных оценок уровня устойчивости болгарских ферм различного юридического типа. В статье оцениваются абсолютные и сравнительные показатели устойчивости основных сельскохозяйственных структур в Болгарии – незарегистрированные фермы физических лиц, индивидуальные предприниматели, кооперативы и компании. Изложен метод исследования и представлены общие характеристики обследованных сельскохозяйственных предприятий. После этого проведено интегральную оценку управления, экономической,

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социальной, экологической устойчивости сельскохозяйственных ферм различного юридического типа. Проанализирована структура сельскохозяйственных предприятий с различными уровнями устойчивости. Предложены вывод из исследования и направления для дальнейших исследований и улучшения оценок устойчивости.

Ключевые слова: устойчивость фермы, управление, экономические, социальные и экологические аспекты, Болгария.

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CAPTIVE AS AN INSURANCE FORMULA FOR RISK MANAGEMENT: ADVANTAGES AND DISADVANTAGES

This article introduces subject of an insurance captive entity, with focus on how it could be used as insurance formula for risk management. Captive might be the most appropriate insurance formula for risk management. However, the level of achieved success depends on many factors. Insurance captives are understood as entities which are formed and owned by companies mostly for the purpose of insuring own risks (pure captive or single parent captive). More and more often captives are also formed by a group of companies (group captives) to insure their properties and liabilities towards 3rd parties. Captives are widely used by many companies nowadays. However, many of them, are used solely for a purpose of a risk cession and premium transfer, with an intention to use captives more as a profit center in a low taxation country rather than for the purpose of risk management (i.e. a more appropriate role for captive would be to support their owners in enterprise risk management – ERM).

This article touches on why captives are not used to their full potential. It may be too challenging for many decision makers to embrace on captives as risk management formula and extend captives' roles to utilize all possible advantages resulting from owning a captive.

Captive can deliver risk management in a more comprehensive way than most commercial insurers on the market. The article also presents advantages and disadvantages of owning an insurance captive.

Key words: captive insurance company, group captive, captive domicile, risk, risk management.

Introduction: **What is a captive?** The term captive is used nowadays in a few different meanings. In finance and insurance context it is mostly used in the following two meanings: **A captive finance company** is a subsidiary whose purpose is to provide financing to customers buying the parent company's products or **a captive insurance company** as a subsidiary that provides risk mitigation services for its parent company or for a group of companies (captive owners).

There are obviously many more formal and more detailed definitions, which come from either international organizations (i.e. from OECD) or from particular countries' tax and insurance legal regulations (domiciles) or else from within insurance theory.

OECD understands captive as "a wholly owned subsidiary of a multinational group of companies which exclusively insures or reinsures the risks of companies that belong to the group. A captive insurance company is usually established in a low-tax country". Whether premiums paid to captive insurance companies by their owners are recognized as business expenses depends on the tax laws of a captive owner [1].

Moving beyond the meaning of captive as defined by OECD or domiciles' legal systems, the writers believe that captive does not have to be neither owned by an international group of companies nor does it have to insure exclusively against risks of its owner. In fact, it is often quite contrary because in certain jurisdictions (i.e. in the USA) local tax authorities demand that premiums paid into a captive can only be recognized as a legitimate business expense when there is a sufficient risk shifting and risk distribution between different lines of insurance and different risk owners (meaning, sources of risks come from different activities of different owners), i.e. it was the case according to the court judgment in 1991 for Harper Group case, in which context the OECD definition is not correct [2].

As an insurance entity, captive is formed by its parent company (or group of companies) for the purpose of insuring its own business (more rarely also to insure third party

business, except for the US and/or group captives). Insurance captive more and more often also plays roles, in which it is used as insurance formula for risk management.

Captives used for business purposes have a long tradition. Some insurance writers go back to ancient times in a search for similarities between contemporary group captives' owners and traders travelling in those days in convoys and self-insuring as a group the common business voyage.

In the modern times, **Frederic M. Reiss** brought a term "captive" and a concept of owning an insurance company into practice for his first client, the Youngstown Sheet & Tube Company in Ohio in the 1950s. Later on, F.M. Reiss created the first captive management company, International Risk Management Limited (IRML) in 1962 in Bermuda to provide administration services of his clients' captives (IRML is now part of Aon Corporation).

Another term that is closely connected with insurance and reinsurance captives is a **domicile**.

Domicile of captive is a tax jurisdiction where business income taxes and other fees are paid by insurance captives.

Insurance captives are often licensed as reinsurance captives (certain domiciles offer different type of a license for reinsurance captive activities). These reinsurance captives effectively reinsure risks of captive owners, which are placed with country insurers all over the world. Local country insurers act as fronting insurers for reinsurance captives. Local country insurers usually retain a small risk on their books (risk sharing takes place between fronting insurer and reinsurance captive) and the rest of a risk is fully reinsured by a captive. Re-insurance captive pays a fronting fee for that service (which includes local claims handling services provided by local insurer).

Domicile can mean a country but it could also mean a certain part of a federal country i.e. a State within the USA.

Captives can write all kinds of insurance risks, including non-life and life (employee benefits). These can also include new kind of risks like cyber risks, supply chain risks, reputational risk and even space risk (vide new captive created by Elon Musk) as well as many others.