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Sustainability of Governing Structures in Bulgarian Farming Industry

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Sustainability of Governing Structures in Bulgarian Farming Industry

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Abstract

The issue of assessment of absolute and comparative sustainability of major governing structures in agrarian and farming industries is among the most topical issues for researchers, farmers, investors, administrators, politicians, interests groups, and the public worldwide. Despite this issue, practically there are no assessments on the sustainability level of the major types of Bulgarian farming enterprises in the conditions of European Union Common Agricultural Policy implementation. This study applies a holistic framework and assesses the absolute and comparative sustainability of major governing structures in Bulgarian farming industry—unregistered holdings, sole traders, cooperatives, and companies of various types. In this paper, the method of the study is outlined, the inclusion of a novel "governance aspect" of sustainability is justified, and the overall characteristics of the surveyed farming enterprises are presented. Then, the integral, governance, economic, social, and environmental sustainability of the farming structures of different juridical types is assessed. Next, the structure of farming enterprises with different sustainability levels is analyzed. Finally, the conclusion from this study and the directions for further research and amelioration of sustainability assessments are presented.

Keywords: Farming enterprise; Sustainability; Governance; Economic; Social; Ecological aspects; Bulgaria.

1. INTRODUCTION

The issue of assessment of absolute and comparative sustainability of governing structures in agrarian and farming industries is among the most topical issues for researchers, farmers, investors, administrators, policy makers, interests groups, and the public worldwide (Andreoli and Tellarini, 2000; Bachev, 2005, 2016, 2017; Bachev and Peeters, 2005; Bachev *et al*., 2016; Bastianoni *et al*., 2001; EC, 2001; FAO, 2013; Fuentes, 2004; Häni *et al*., 2006; OECD, 2001; Rigby *et al*., 2001; Sauvenier *et al*., 2005; UN, 2015). Nevertheless, practically there are no comprehensive assessments on the sustainability level of the Bulgarian farms of different juridical types in the conditions of European Union (EU) Common Agricultural Policy (CAP) implementation.

This study applies a holistic framework and assesses absolute and comparative sustainability of governing structures in the Bulgarian farming industry.

In this paper, the method of the study is presented, the inclusion of a novel "governance aspect" of sustainability is justified, and the overall characteristics of the surveyed farming enterprises are outlined. Then, the integral, governance, economic, social, and environmental sustainability of farming enterprises of different types is assessed. Finally, the directions for further research and practices in sustainability assessment are suggested.

2. METHODS

Investigating the farming enterprise as a governance structure allows to properly understand the efficiency and sustainability of economic organizations in agriculture (Bachev, 2004, 2005). In a long term, no inefficient economic organization would exist. In other words, the inefficient organizations will be replaced by more efficient arrangements. Therefore, the problem of assessment of sustainability of farms is directly related to the estimation of the level of governance, economic, social, and environmental efficiency of farms.

In traditional economics, the farm is presented as a "production structure" and the analyses of efficiency are restricted to "optimization of technological factors" ("production" costs) according to the marginal rule. This approach fails to explain a high sustainability and coexistence of numerous farms of different types (semi-market holdings, cooperatives, small commercial farms, and large agri firms) with great variation in "efficiency levels" in Bulgaria (and other Central and East European countries) during the last two and a half decades.

In real economy with positive transition costs and institutions, the "taht matter" farms and other agrarian organizations are not only production structures but also major governance structures—modes for governing activity and transactions (Bachev, 2004). Therefore, the sustainability of diverse types of farming structures cannot be properly understood and estimated without analyzing their comparative production *and* governance potential. Following new institutional economics logic, the governance efficiency characterizes the comparative potential of a particular form (type of farm) to minimize the transaction costs and increase the transaction benefits in relation to another feasible organization in specific socioeconomic and natural environment.

Hence, a farm will be efficient (sustainable), if it manages all activities and transactions in the most economical manner for owner(s). If a farm does not govern transactions (activity) effectively, it will not be sustainable. This is because it will experience issues such as high costs and difficulties for functioning in specific environments (possibilities and restrictions) *compared* to another feasible (alternative) organization. In this case, there will be strong incentives for exploring existing potential (adapting to a sustainable state) through reduction or enlargement of farm size or via reorganization or liquidation of farm. Consequently, some of the following changes will take place: alternative farm or nonfarm application of available resources; or farm expansion through employment of additional resources; or trade instead of internal use of owned land and labor; or taking over by or merger with another farm of business (Bachev and Petters, 2005).

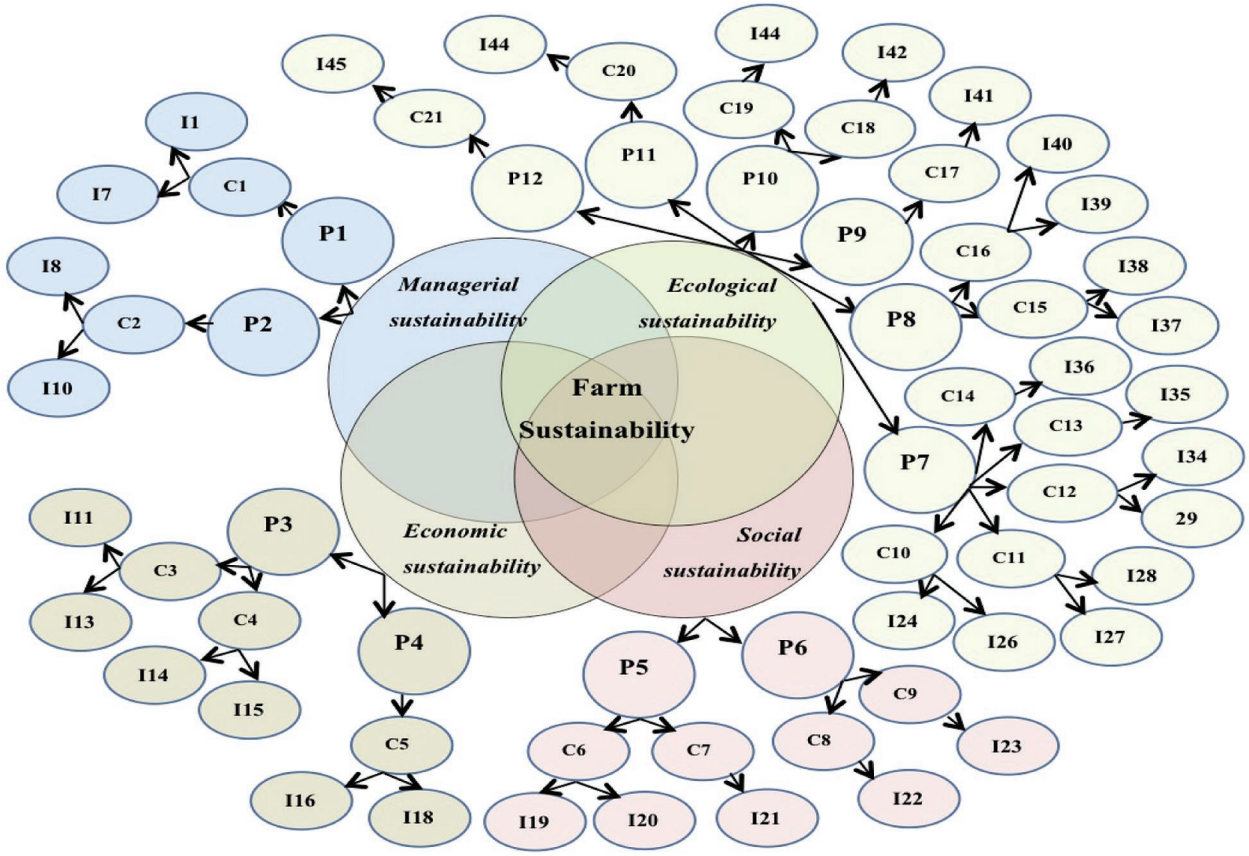
The modes of governance and acceptable (for owners, community, and society) net benefits will vary according to the personal preference of individual agents, entrepreneurial capability and experience, risk aversion, opportunity costs of owned resources, institutional restrictions and norms, pressure and opportunities of specific environment (competition, demand, cooperation, support, and climate change), etc.

The major types of farm activities (and transactions) that are subjects of management are as follows: supply and governance of labor resources; supply and governance of land and natural resources; supply and governance of material inputs; supply and governance of innovations; supply and governance of finance; and governance of marketing of products and services, etc. Sustainability assessment is to include the comparative efficiency of governance of each of these activities of a farm in specific institutional, economic, social, and natural environment in which that holding functions and evolves. If it is detected as a lack of acceptable efficiency (significant costs and difficulties, insufficient benefits) in relation to feasible alternative(s), then the farm is considered as low-sustainable or non-sustainable farm.

Next, the potential of the farm for adaptation to constantly evolving market, economic, institutional, social, and natural environment through effective changes in governing forms, size, production structure, technologies, and behavior should be evaluated. If the farm does not have the potential to stay at or adapt to new more sustainable level(s), then it will diminish its comparative advantages and sustainability, and (eventually) will be liquidated or transformed into another type of organization.

For instance, if a farm experiences enormous difficulties in meeting the institutional norms and restrictions (imposed and enforced by EU new standards for quality, safety, environmental protection, and animal welfare); higher social norms and requirements (for working conditions, income level, welfare of farmers, and farm households; new demands of rural communities), and taking advantage of institutional opportunities (access to public support programs); it has serious problems in supplying the managerial capital (as it is in a one-person farm when an aged farmer does not have a successor wishing or capable of taking over the business), supply of farmland (big demand of farmland by other entrepreneurs or for nonagricultural use), funding activities (insufficient own finance, impossibility for coalition, selling equity, or buying credit), or marketing output and services (changing market demand for certain products or needs of co-owners and buyers, a strong competition with imported products); it is unable to adapt to existing environmental challenges and risks (warning, extreme climate, soil acidification, waters pollution, etc.), then it will not be sustainable despite the high historical or current efficiency. Therefore, the adaptability of a farm characterizes

Figure 1. Framework for Assessing Sustainability of Bulgarian Farms.



Source: the author.

the greatest extent of farm sustainability, and it should be used as a main criteria and indicator for sustainability assessment.[1]

We proved that the definition of farm sustainability is based on the "literal" meaning of that term and perceived as a system characteristics and "ability to continue through time" (Bachev, 2005). It has to characterize all major aspects of farming enterprise activity, which is to be managerially sustainable, economically sustainable, 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 socioeconomic and natural environment in which it operates and evolves.

In this study, we apply a hierarchical framework including 12 principles, 21 criteria, 45 indicators, and reference values to assess the sustainability level of Bulgarian farms (Figure 1). The content, justification, modes of calculation, and integration of sustainability indicators are already presented in detail in our previous study (Bachev, 2016).

The assessment of the sustainability of farms in the country is based on a 2016 survey with the managers of "representative" market-oriented farms of different types. The survey was conducted 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 types and location.

The assessment of the sustainability level of an individual farm is based on the estimates of the managers for each Indicator in four qualitative levels: "high/higher or better that the average in the sector/

[1] Our suggestion to use adaptability as a criteria and indicator for sustainability has been already incorporated in the most comprehensive System for Assessing Sustainability of Agriculture Systems in Belgium—SAFE (Sauvenier *et al.*, 2005).

region," "similar/good," "low/lower or worse than the average in the sector/region," "negative/unsatisfactory/unacceptable." Then, the qualitative estimates for individual farms were quantified and transformed into sustainability indexes for each indicator (SI(i)) using the following scales: 1 for "high," 0.66 for "good or average," 0.33 for "low," and 0 for "unsatisfactory or unacceptable."

For the 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 the plain, plain-mountainous, or mountainous region. The latter approach guarantees an adequate assessment, because the managers of the farms are well aware of the specificity and comparative characteristics of their holdings in relation 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 using the following formulas:

$SI(c) = \Sigma SI(i)/n$	n – number of indicators in a particular criteria
$SI(p) = \Sigma SI(c)/n$	n – number of criteria in a particular principle
$SI(a) = \Sigma SI(p)/n$	n – number of principles in a particular aspect
$SI(i) = \Sigma SI(a)/4$	

The survey with the farm managers took part in the summer of 2016 and included 190 registered agricultural producers, which comprise approximately 0.2% of all registered under 1999 Regulation no. 3 for creation and maintaining a registry of agricultural producers in Bulgaria.[2]

The managers of "representative" farms of all juridical types, size, specialization, and location 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.

3. SUSTAINABILITY LEVEL OF FARMING STRUCTURES

The multi-indicators assessment of the 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 (Figure 2). 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.

The analysis of the individual Indexes for major sustainability principles, criteria, and indicators allows to identify the components contributing to diverse aspects of farms' sustainability in the country. For instance, the 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 (Figure 3). Similarly, it is clear that, despite 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.

[2] According to the Ministry of Agriculture and Food during 2014–15 business year there is a significant increase in the number of registered agricultural producers, which in the end of July 2015 reached 94,815.

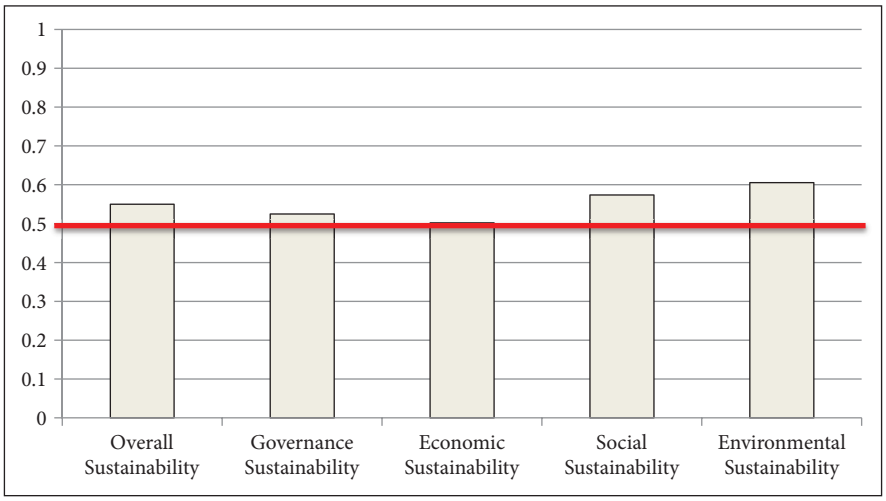
Table 1. Type and Number of Surveyed Agricultural Farming Enterprises (percent, number*).

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.

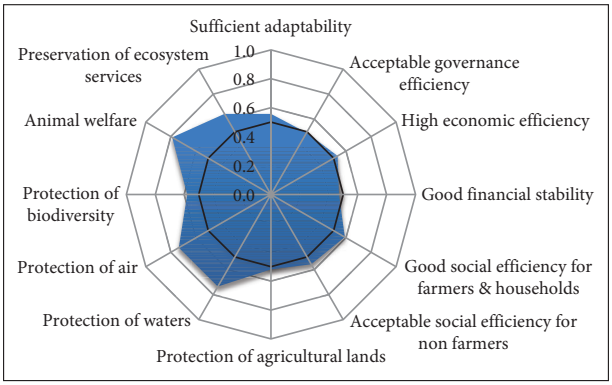
In-depth analysis for individual criteria and indicators further specifies the elements, which enhance or reduce the sustainability level of farms. For instance, insufficient comparative governance efficiency and financial capability (Figure 4) are determined accordingly by the following: a low comparative efficiency of supply of short-term inputs in relation to alternative organizations (0.28), and unsatisfactory profitability

Figure 2. Indexes of Integral, Governance, Economics, Social, and Environmental Sustainability of Bulgarian Farms.



Source: survey with managers of farms, July 2016.

Figure 3. Index of Sustainability of Bulgarian Farms for Major Principles for Governance, Economics, Social, and Environmental Sustainability.



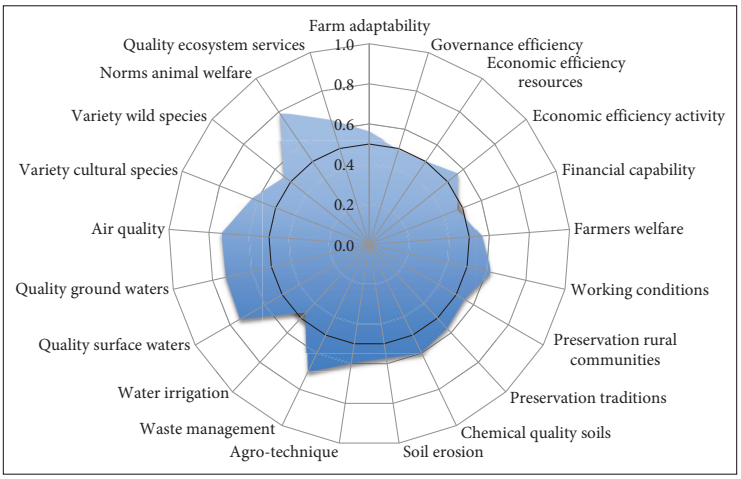
Source: survey with managers of farms, July 2016.

of own capital (0.41) and overall liquidity (0.48) of farms (Figure 5). Similarly, the 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).

The low levels of indicators identify the specific areas for improvement of sustainability of farms through adequate changes in the management strategy and/or public policies. For instance, despite 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, the effective measures should be performed 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.

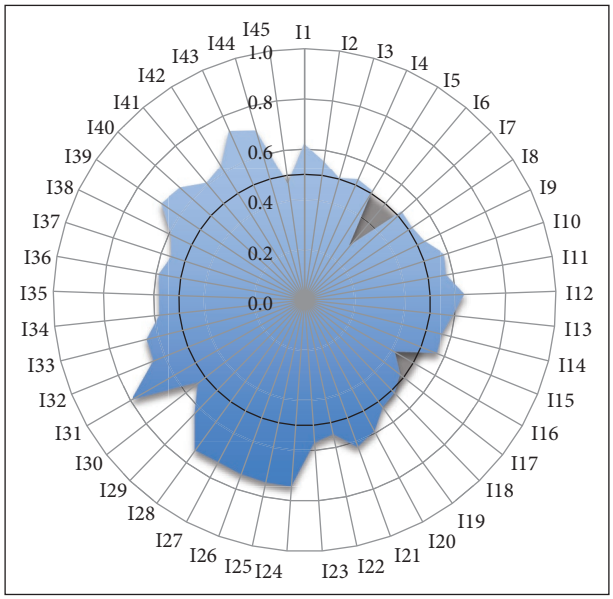
On the other hand, the superior levels of certain indicators show the absolute and comparative advantages of the Bulgarian farms related to sustainable development. At the current stage of development, the latter are associated with respect to animal welfare standards, preservation of quality of surface 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

Figure 4. Level of Sustainability of Bulgarian Farms for Individual Criteria for Governance, Economics, Social, and Environmental Sustainability.



Source: survey with managers of farms, July 2016.

Figure 5. Indicators* of Assessing Sustainability of Bulgarian Farms.



**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 Recourses; 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 Solidification; 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*

Source: survey with managers of farms, July 2016.

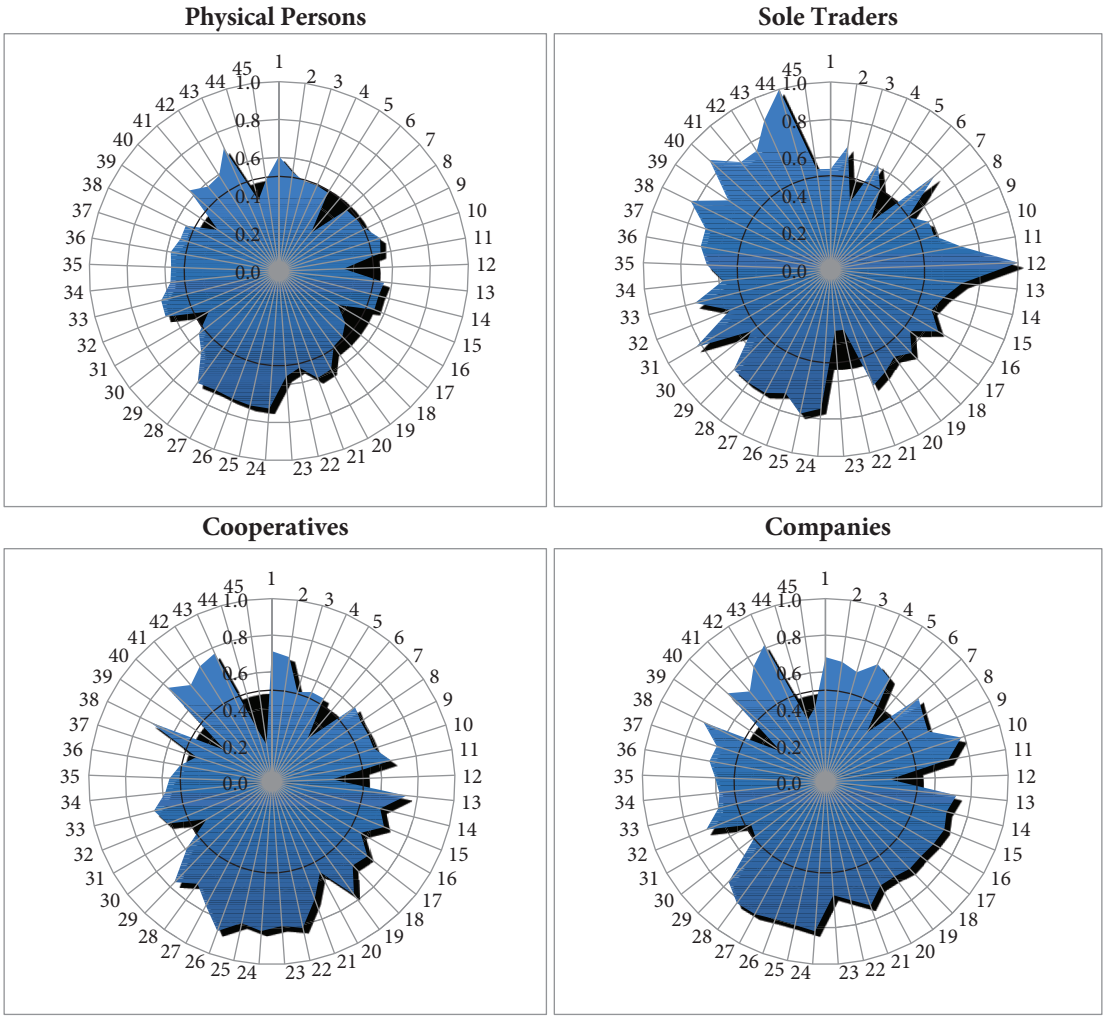
conditions and comparative satisfaction from farming activity, optimal productivity of livestock, good adaptability to market (prices, competition, demands), and comparative governance efficiency of marketing of products and services.

4. SUSTAINABILITY INDICATORS FOR FARMING ENTERPRISES OF DIFFERENT JURIDICAL TYPES

There is a great variation in the levels of individual sustainability indicators for farms of different juridical types (Figure 6).

Most sustainability indicators of physical persons are low and lead to a decrease in sustainability for individual aspects and overall sustainability. In the governance aspect, the sustainability of these enterprises is 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, the sustainability of physical persons is particularly low with 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, the sustainability of these enterprises is only low in relation to income per

Figure 6. Sustainability Indicators of Farms of Different Juridical Types in Bulgaria.



Source: survey with farm managers, July 2016.

farm-household member (0.49) while in the environmental plan concerning complying with the 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, the adequate measures should be taken by managers and state authority in order to improve the 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 the aspect and overall sustainability of these types of holdings.

Sole traders are with low values for governance sustainability with 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 with respect to their contribution to preservation of rural communities and preservation of traditions (by 0.33).

Simultaneously, sole traders exhibit 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 the implementation of effective crop rotation. Moreover, the 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, several 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. In addition, sole traders are 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 these contribute to the development in their governance and economic sustainability, as well.

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, and contribution to preservation of rural communities and preservation of traditions. In addition, numerous environmental indicators of cooperative enterprises are 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 with 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 the activities of cooperatives should be considerably improved in order to increase the governance, economic, environmental, and integral sustainability of these enterprises.

For companies, within the borders of a good sustainability, the highest are the 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. With respect to economic sustainability, the best levels are for labor productivity and income of enterprise. In contrast, with respect to social sustainability, the best levels are for compliance with working conditions standards. For environmental suitability, the superior are the 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.

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 should be improved in order to increase their governance, economic, environmental, and integral sustainability.

5. IN-DEPTH ANALYSIS OF SUSTAINABILITY OF FARMS OF DIFFERENT JURIDICAL TYPES

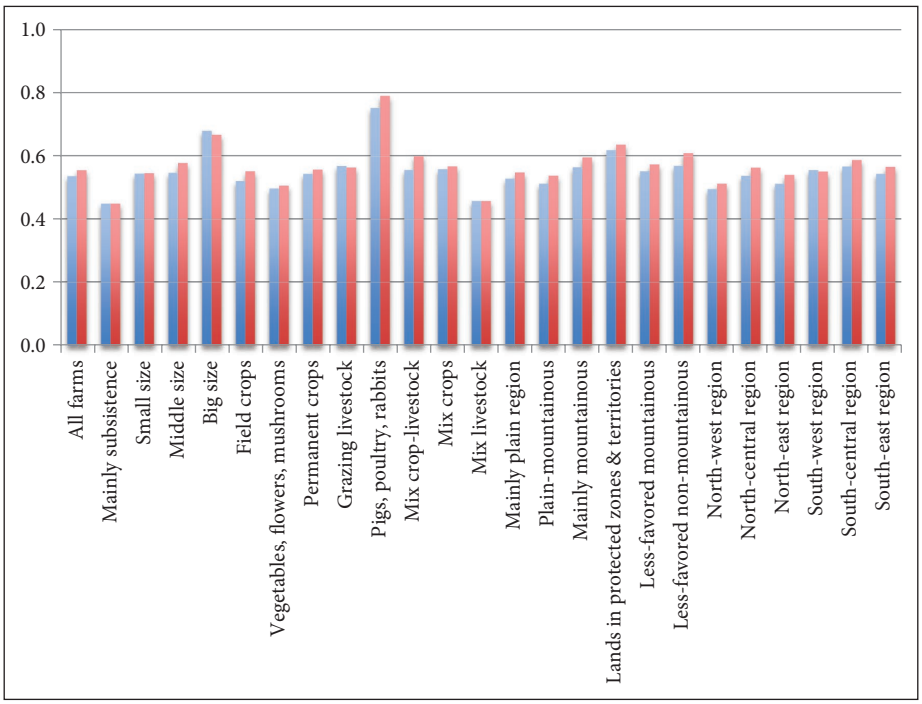
Holdings of physical persons are the most numerous and to a great extent they (pre)determine the "average" sustainability level of all farms in the country. Consequently, the level of the integral sustainability of physical persons of different types deviates insignificantly from the average sustainability levels of respective categories in the country (Figure 7).

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

The holdings of physical persons with big size, specialized in pigs, poultry, and rabbits, with lands in protected zones and territories, and located in the south-central region of the country are with the best sustainability (within a good level). At the same time, the holdings of physical persons, which are predominately for subsistency, specialized in mix-livestock and in vegetables, flowers, and mushrooms, and located in the north-west region of the country are with low sustainability. According to the ecological location, the sustainability of physical persons situated in the plain-mountainous regions of the country is the lowest (within a good level).

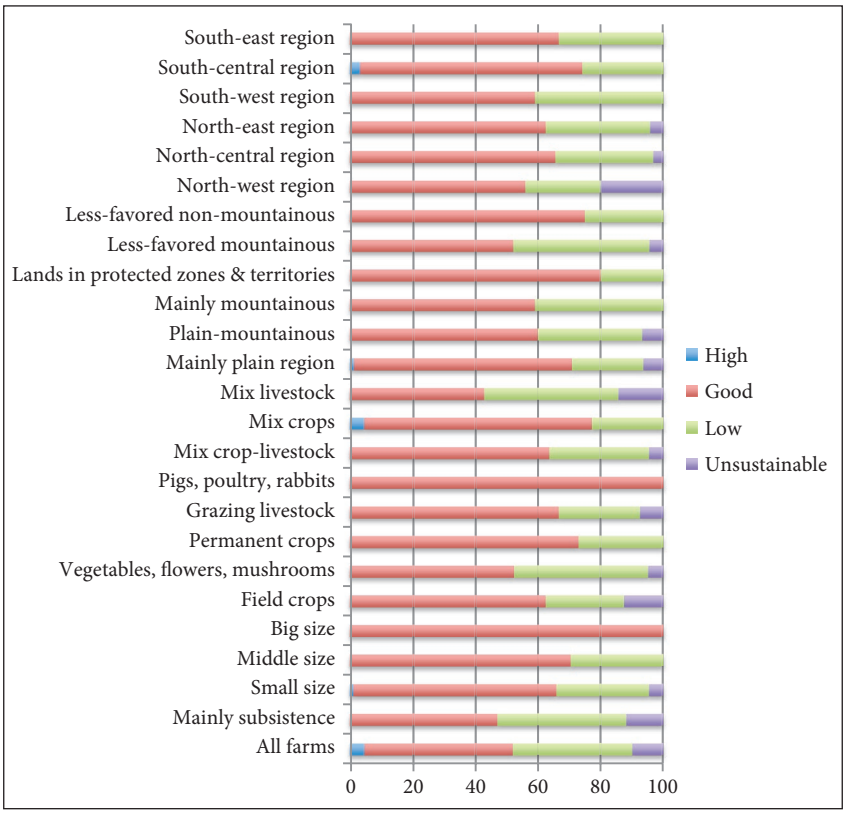
Moreover, there exists a significant differentiation in the share of farms with different levels of sustainability for the major type of physical persons (Figure 8). All physical persons with big size for the sector and specialized in pigs, poultry, and rabbits, and most of these in mix cops and permanent crops, and located in the non-mountainous regions with natural handicaps and with lands in protected zones and territories are with good sustainability, and a part is with high sustainability. On the other hand, the majority of physical persons, which are predominately for subsistence, and these with mix livestock are with low sustainability

Figure 7. Levels of Sustainability of Holdings of Physical Persons of Different Types in Bulgaria.



Source: survey with managers of farms, July 2016.

Figure 8. Structure of Physical Persons of Various Types with Different Sustainability Levels in Bulgaria (Percent).



Source: survey with managers of farms, July 2016.

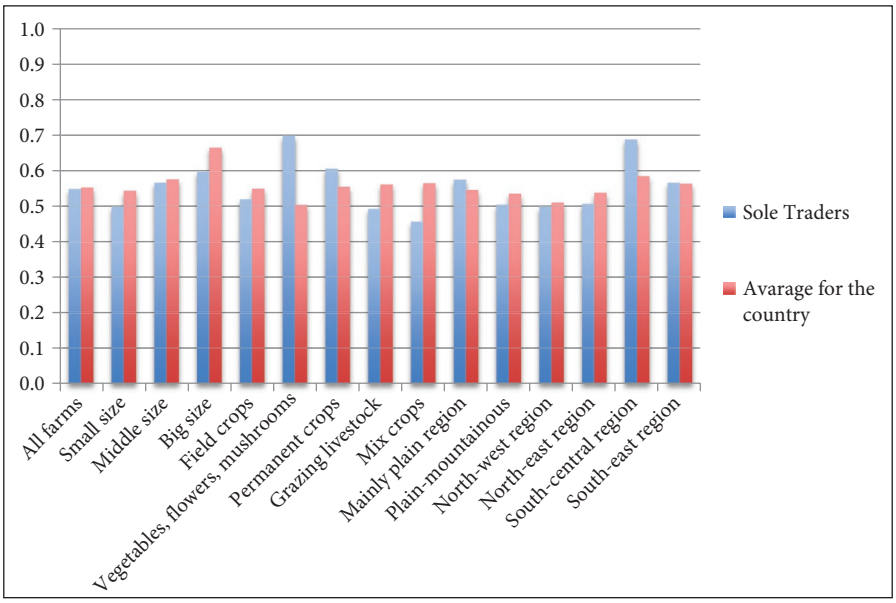
or unsustainable. Moreover, the portion is considerably of low sustainable or unsustainable physical persons in groups with vegetables, flowers, and mushrooms, grazing livestock, and crop-livestock specialization, those located in the mountainous regions with natural handicaps, in the plain-mountainous regions, and in the north-west and south-west regions of the country.

For sole traders, there is also variation in the sustainability level dependent on size, specialization, ecological, and geographical location. Sole traders with big size for the sector, specialized in vegetables, flowers, and mushrooms, and located in the plain regions and in the south-central region of the country are with the highest sustainability (Figure 9). Simultaneously, sole traders specialized in mix crops and in grazing livestock, and in the border with the inferior level with small size, and located in the plain-mountainous and north-west regions of the country are with the lowest sustainability.

In the groups of sole traders 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. This demonstrates that the specific juridical status of sole trader is a critical (and more important) factor that determines the level of sustainability in this group, rather than the 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 dominate the formation of another sustainability level.

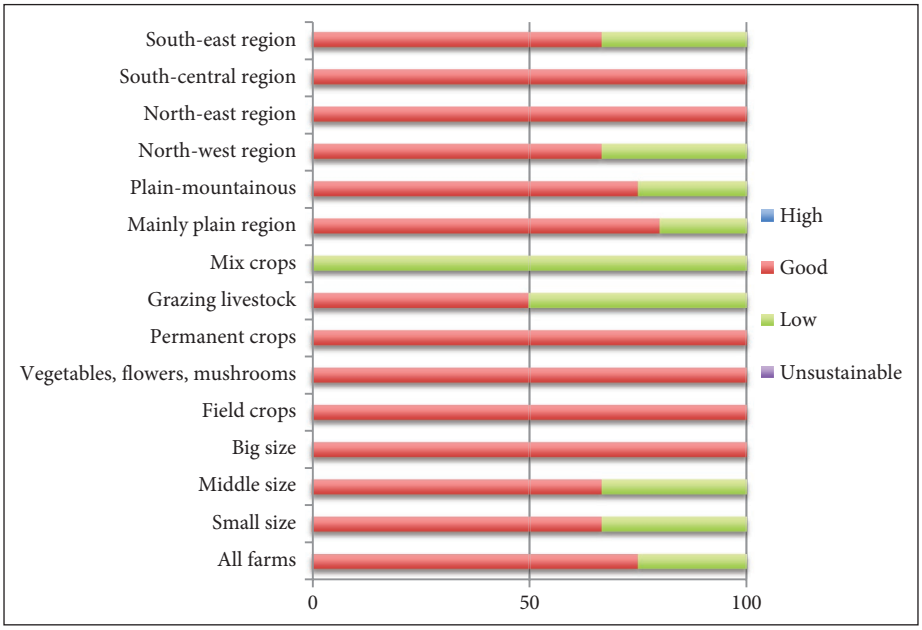
There are significant variations in the share of sole traders of different types with dissimilar sustainability levels (Figure 10). All farms with big size, specialized in field crops, vegetables, flowers, and mushrooms, permanent crops, and those located in the north-east and south-central regions of the country are with low 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 the north-west and south-east regions of the country are low sustainable.

Figure 9. Levels of Sustainability of Sole Traders of Different Types in Bulgaria.



Source: survey with managers of farms, July 2016.

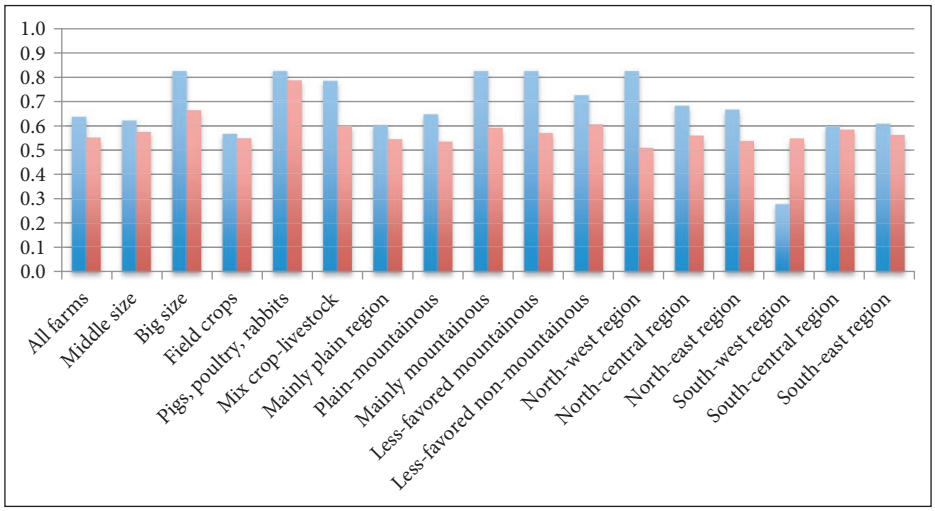
Figure 10. Structure of Sole Traders of Various Types with Different Sustainability Levels in Bulgaria (Percent).



Source: survey with managers of farms, July 2016.

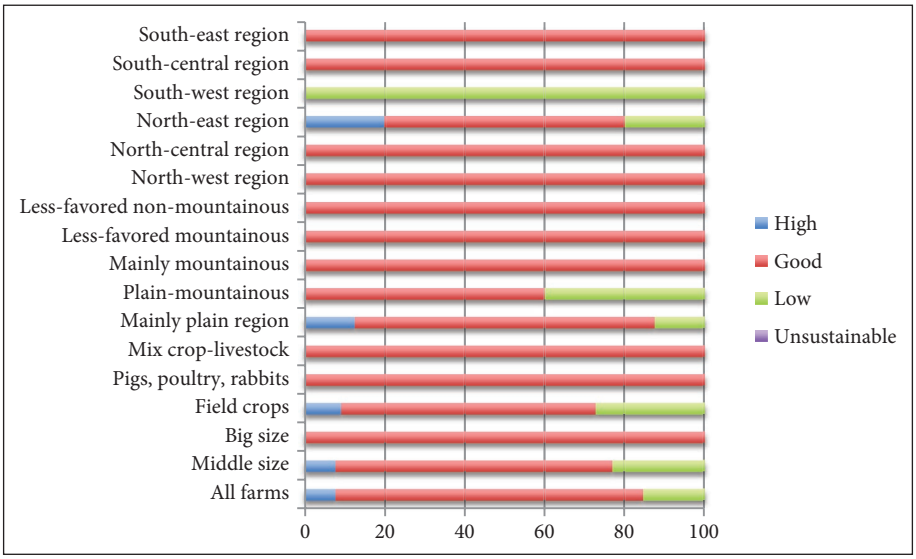
For cooperatives, there exists considerable differentiation in the sustainability level depending on the size, specialization, and location of the farms. The cooperatives with big size for the sector, specialized in pigs, poultries, and rabbits, and located in the mountainous regions, mountainous regions with handicaps, and in the north-central region of the country (Figure 11) are with the best sustainability (close to the border with a high level). The cooperatives located in the south-west region of the country are with the lowest sustainability.

Figure 11. Levels of Sustainability of Cooperatives of Different Types in Bulgaria.



Source: survey with managers of farms, July 2016.

Figure 12. Structure of Cooperatives of Various Types with Different Sustainability Levels in Bulgaria (Percent).



Source: survey with managers of farms, July 2016.

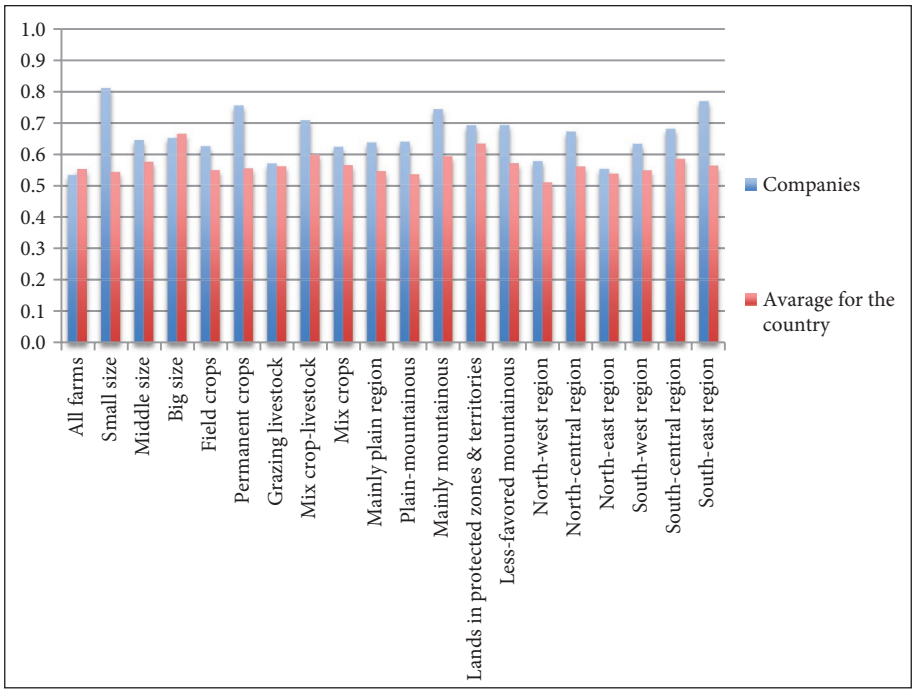
The levels of sustainability of most cooperatives of different types deviate considerably from the average levels for sustainability in these groups of holdings in the country. This proves that the specific "cooperative forms" (the juridical status of cooperative) is the critical factor that determines the sustainability levels of the cooperative farms of a particular type, rather than their belonging to a 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 (Figure 12). All cooperatives with big size, specialized in pigs, poultry, and rabbits, crop livestock, and those located in the mountainous regions, the mountainous and non-mountainous regions with natural handicaps, and in the north-west, north-central, south-central, and south-east regions of the country are with good sustainability. The greatest portion of highly sustainable cooperatives are located

in the north-east region and plain regions of the country as well as specialized in field crops. At the same time, each of the cooperatives in the south-west region and 40% of those located in the plain-mountainous regions of the country are with low sustainability.

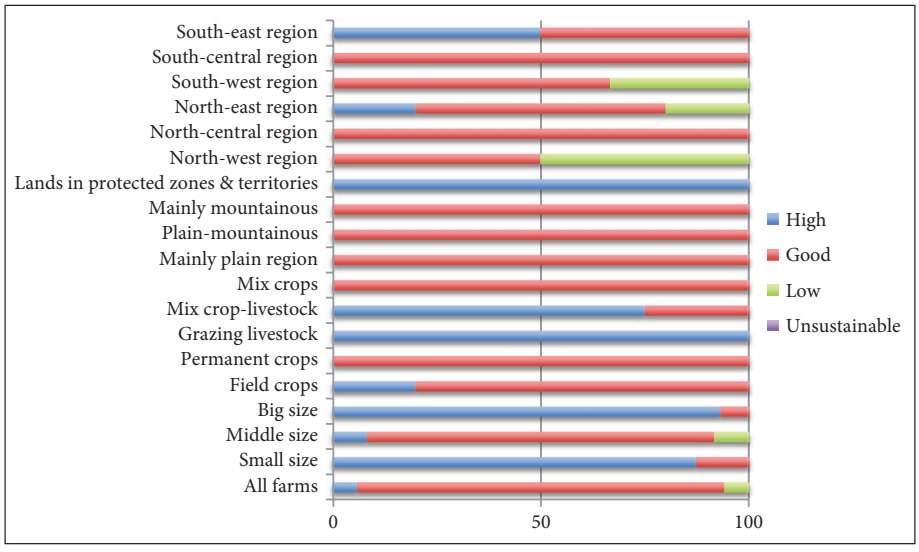
There are a significant specificity and variation in the sustainability levels of companies with different size, specialization, and location (Figure 13). Companies with small size for the sector, specialized in

Figure 13. Levels of Sustainability of Companies of Different Types in Bulgaria.



Source: survey with managers of farms, July 2016.

Figure 14. Structure of Companies of Various Types with Different Sustainability Levels in Bulgaria (Percent).



Source: survey with managers of farms, July 2016.

permanent crops, located in the mountainous regions, and in the south-east region of the country are with the highest sustainability. Simultaneously, farms of that juridical type specialized in grazing livestock, and located in the north-west region of the country are with the lower levels of sustainability.

There are great elevations in the 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 the north-east region of the country. This indicates that for most categories of companies the specific juridical status is critical for one or another level of sustainability. The sole exceptions are mentioned above the 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 the formation of sustainability.

Moreover, in companies, there is a great differentiation in fractions of holdings with one or another level of sustainability in each particular group (Figure 14). All farms with crop-livestock specialization, and those located in the 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 the north-west region of the country and every third of those in the south-west region are of low sustainability.

6. CONCLUSION

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

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

The overall sustainability of the 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 the sustainability levels of farms of different juridical types as well as in the shares of holdings with dissimilar levels of sustainability. The distribution of farms of different types in groups with diverse levels of sustainability should be considered when the number and importance of holdings of each kind are forecast, and the public (structural, sectorial, regional, environmental, etc.) policies for supporting the agricultural producers of certain type, subsectors, eco-systems, and regions of the country are modernized.

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

References

Andreoli M, Tellarini V. 2000. Farm sustainability evaluation: methodology and practice. Agriculture, Ecosystems & Environment 77(1-2): 43-52.

Bachev H. 2004. Efficiency of Agrarian Organizations, in Farm Management and Rural Planning No 5. Kyushu University: Fukuoka: 135-150.

Bachev H. 2005. Assessment of sustainability of Bulgarian farms. In Proceedings, XIth Congress of the European Association of Agricultural Economists, Copenhagen.

Bachev H. 2016. A framework for assessing sustainability of farming enterprises. Journal of Applied Economic Sciences Vol. XI, 1(39): 24-43.

Bachev H. 2017. Sustainability level of Bulgarian farms. Bulgarian Journal of Agricultural Science 23(1): 1-13.

Bachev H, Koteva N, Kaneva K, Terziev D, Vanev D. 2016. Sustainability of Bulgarian farms during reformed CAP implementation. In Proceedings of International Conference "Fostering Agriculture Innovation and Business Opportunities for Rural Renaissance," October 27-28, 2016, Sofia.

Bachev H, Peeters A. 2005. Framework for Assessing Sustainability of Farms, in Farm Management and Rural Planning No 6. Kyushu University: Fukuoka: 221-239.

Bastianoni S, Marchettini N, Panzieri M, Tiezzi E. 2001. Sustainability assessment of a farm in the Chianti area (Italy). Journal of Cleaner Production 9(4): 365-373.

EC. 2001. A Framework for Indicators for the Economic and Social Dimensions of Sustainable Agriculture and Rural Development. European Commission: Brussels, Belgium.

FAO. 2013. SAFA. Sustainability Assessment of Food and Agriculture Systems Indicators. FAO: Rome, Italy.

Fuentes M. 2004. Farms management indicators related to the policy dimension in the European Union. In OECD Expert Meeting on Farm Management Indicators and the Environment, March 8-12, 2004, New Zealand.

Häni F, Pintér L, Herren H. 2006. Sustainable agriculture. From common principles to common practice. In Proceedings of the first Symposium of the International Forum on Assessing Sustainability in Agriculture (INFASA), March 16, 2006, Bern, Switzerland.

OECD. 2001. Environmental Indicators for Agriculture. Volume 3: Methods and Results. OECD: Paris.

Rigby D, Woodhouse P, Young T, Burton M. 2001. Constructing a farm level indicator of sustainable agricultural practice. Ecological Economics 39(3): 463-478.

Sauvenier X, Valekx J, Van Cauwenbergh N, Wauters E, Bachev H, *et al*. 2005. Framework for Assessing Sustainability Levels in Belgium Agricultural Systems – SAFE. Belgium Science Policy: Brussels.

UN. 2015. Transforming Our World: The 2030 Agenda for Sustainable Development, United Nations Resolution A/RES/70/1 of 25 September 2015.

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