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ASSESSMENT OF SUSTAINABILITY OF AGRICULTURAL FARMS OF NATURAL PERSONS IN BULGARIA

A holistic framework is applied on and assessment is made of sustainability of farms of Natural (Physical) Persons in Bulgaria. A framework of study is presented and overall characteristics of surveyed farms are outlined. Assessment is made on integral, governance, economic, social, and environmental sustainability of farms as a whole, and of different size, production specialization, and ecological and geographical location. Factors for improving sustainability of farms are identified, and directions for further research and amelioration of assessment practices in the sector are suggested.

JEL: Q12; Q18; Q56; Q57

Keywords: *sustainability of farms; governance, economic, social, environmental aspects*

The issue of adequate assessment of diverse aspects of sustainability of farms is among the most topical in both academic and practical respect – for managers of farms, professional associations of agricultural producers, policy-makers, interests groups, researchers, and public at large (Bachev, 2005, 2006, 2016, 2016a, 2016b; Ivanov et al., 2009; Yovchevska, 2016; Koteva, 2016; Kaneva, 2015; Hadjieva et al., 2005; Andreoli and Tellarini, 2000; Bachev and Petters, 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). At the current stage of European Union (EU) Common Agricultural Policy (CAP) implementation in Bulgaria in particuar very important are following questions: how to assess sustainability of Bulgarian farms; what is sustainability level of agricultural farms of different type; to what extent various mechanisms and instruments of Common policies of the Union affect sustainability of different farms; how to improve sustainability of holdings through effective changes in management strategies and forms of public intervention in the sector, etc.

All these issues are particularly important in respect to a specific type of agricultural holdings in the country – unregistered farms of Natural Persons. These farms account for almost 98% of all farms in the country, cultivate a third of all farmlands, graze 85% of the cows, 90% of the sheep, and around a third of the pigs, and employ almost 93% of the total workforce in the sector (MAF, 2012).

In academic publications, official documents and agricultural practices it is already a common practice, that besides the “pure” production-economic aspects, the farms sustainability has broader social and environmental aspects (“pillars”), which are equally important and have to be accounted for. However, critical for

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farm' sustainability and efficiency "governance" functions of the farm are largely ignored (Bachev, 2012). For example, frequently comparative governance efficiency and capacity for adaptation (pre) determine the overall sustainability of a farm despite its productivity, social responsibility or nature conservation of activity.

Furthermore, most of recommended frameworks for sustainability assessment employ "universal" approach for "faceless" farms without taking into consideration specificity of farm and socio-economic and natural environment in which individual holding functions. In such a "Nirvana" approach not real alternative organizations are used as a criterion but unrealistic (ideal) modes such as model of farming in developed countries; presumptions for universal and perfectly-defined and enforced property rights; universal rights and standards; effectively working administration; situation without public interventions in the sector, etc. In fact, the assessment framework is to take into account the real socio-economic, institutional and natural environment, in which a farm functions – the specific "Bulgarian" model of EU CAP implementation, evolution of technologies, industries, social preferences and demands, climate changes affecting agriculture, etc.

Finally, most of existing frameworks are not hierarchical and lack systemic organization of aspects and components of farm's sustainability, which (pre) determine arbitrary selection of the assessment indicators. Usually, the systems applied are either too simplified (limited number of "major" indicators), or unilateral ("pure" economic aspects, "pure" ecological" aspects), or too complicated and impossible to use in practice by farmers and managerial bodies.

This article applies a holistic framework for assessing sustainability of Bulgarian farms at the current stage of EU CAP implementation in Bulgaria, and evaluates absolute and comparative sustainability of holdings of Natural Persons with different size, product specialization, and ecological and geographical location.

Framework for assessing sustainability of farms of Natural Persons

Studying the farm as a management (governance) structure enables a proper understanding of efficiency and sustainability of economic organizations in agriculture (Bachev, 2012). In the long run no economic organization would exist if it were not efficient, otherwise it will be replaced by more efficient arrangement. 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 the Traditional Economics the farm is presented as a "production structure" and the efficiency analysis is restricted to "optimization of technological factors" ("production" costs) according to marginal rule. However, this approach fails to explain a high sustainability and coexistence of numerous farms of different type (semi-market holdings, cooperatives, small commercial farms, large agri-firms, etc.) with great variation in "efficiency levels" in Bulgaria during the last two and a half decades.

In the real economy with positive transition costs and institutions "that matter" farms and other agrarian organizations are not only production but major governance structures – modes of governing the activities and the transactions (Bachev, 2012).

Therefore, sustainability of diverse type of farming structures cannot be properly understood and estimated without analyzing their comparative production *and* governance potential. The governance efficiency characterizes comparative potential of a particular form (type of farm) to minimize transaction costs and to increase transaction benefits in relation to another feasible organization in the specific socio-economic and natural environment (Bachev, 2012).

Hence a farm will be efficient (sustainable) if it manages all activities and transactions in the most economical way for the owner(s). If a farm does not govern transactions (activity) effectively, it will be unsustainable since it will have high costs and difficulties for functioning in the specific environment (as possibilities and restrictions) *compared* to another feasible (alternative) organization. In that case, there will be strong incentives for exploring the existing potential (adapting to a sustainable state) through reduction or enlargement of farm size, or via reorganization or liquidation of the farm. Consequently, some of the following will take place – either alternative farm or non-farm application of available resources; or farm expansion through employment of additional resources; or trade instead of internal use of own land and labor; or taking over by or merger with another farm or business.

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

Major types of farm activities (and transactions) subject of management are: 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. Thus, sustainability assessment is to include comparative efficiency of governance of each of these farming activities in the specific institutional, economic, social and natural environment in which that holding functions and evolves. If a lack of acceptable efficiency (significant costs and difficulties, insufficient benefits, etc.) is detected in relation to a feasible alternative(s), then the farm is to be considered low-sustainable or non-sustainable.

Next, the farm's potential for adaptation to constantly evolving market, economic, institutional, social and natural environment has to be evaluated through effective changes in governing forms, size, production structure, technologies, and behavior. If the farm does not have a potential to remain at or adapt to new more sustainable level(s), its comparative advantages and sustainability will be diminished, and (eventually) will be liquidated or transformed into another type of organization. For instance, if a farm faces enormous difficulties in meeting institutional norms and restrictions (imposed and enforced by EU new standards for quality, safety, environmental protection, 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); or it has serious problems supplying managers (as it is the case in a one-person farm when an elderly farmer does not have a successor wishing or being capable to take over the business), or supply of farmland (big demand of farmland by other entrepreneurs or for non-agricultural use), or 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); or 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, adaptability of farm characterizes to the greatest extent the farm sustainability and has to be used as a main criteria and indicator for sustainability assessment.

In the literature and managerial practice there are diverse approaches for defining the farm sustainability: as alternative ideology (Edwards et al.; VanLoon et al.); as a new strategy (Mirovitskaya and Ascher, 2001); as a characteristic feature of agrarian system – e.g. „ability for achieving multiple goals" (Brklacich et al., 1991; Hansen, 1996), "capability (potential) of the system to maintain and improve its functions" (Lopez-Ridaura et al.,2002 ; Lewandowski et al., 1999); as a process of understanding and adapting to changes (Raman, 2006), etc.

We believe that the definition of the farm sustainability has to be based on the "literal" meaning of that term and perceived as system characteristics and "ability to exist in time". It has to specify all major aspects of farming activity, which is to be managerially sustainable, and economically sustainable, and socially sustainable, and environmentally sustainable. Therefore, farm sustainability characterizes the ability (internal potential, incentives, comparative advantages, importance, efficiency) of a particular farm to maintain its governance, economic, social and ecological functions in the long run in the specific socio-economic and natural environment in which it functions and evolves (Bachev, 2016). Depending on the combination of all these dimensions, sustainability of a particular farm could be high, good, unsatisfactory, or the farm is unsustainable.

Farm sustainability has four aspects ("pillars"), which are equally important and always have to be taken into account:

- governance sustainability - to have good or high absolute and comparative efficiency in organization and management of activity and (internal and external) relations of the farm, and a high adaptability to evolving socio-economic and natural environment, according to specific preferences (type of enterprise, manner of production, long-term goals, etc.) and capabilities (education, experience, available resources, connections, power positions, etc.) of the owners of the enterprise;
- economic sustainability – to have good or high productivity of deployed natural, labor, material and financial resources, sufficient ("acceptable") economic efficiency and competitiveness, and the required financial stability of activity;
- social sustainability – to have good or high social responsibility in regard to farmers, hired labor, other agents, communities, and consumers, and to contribute

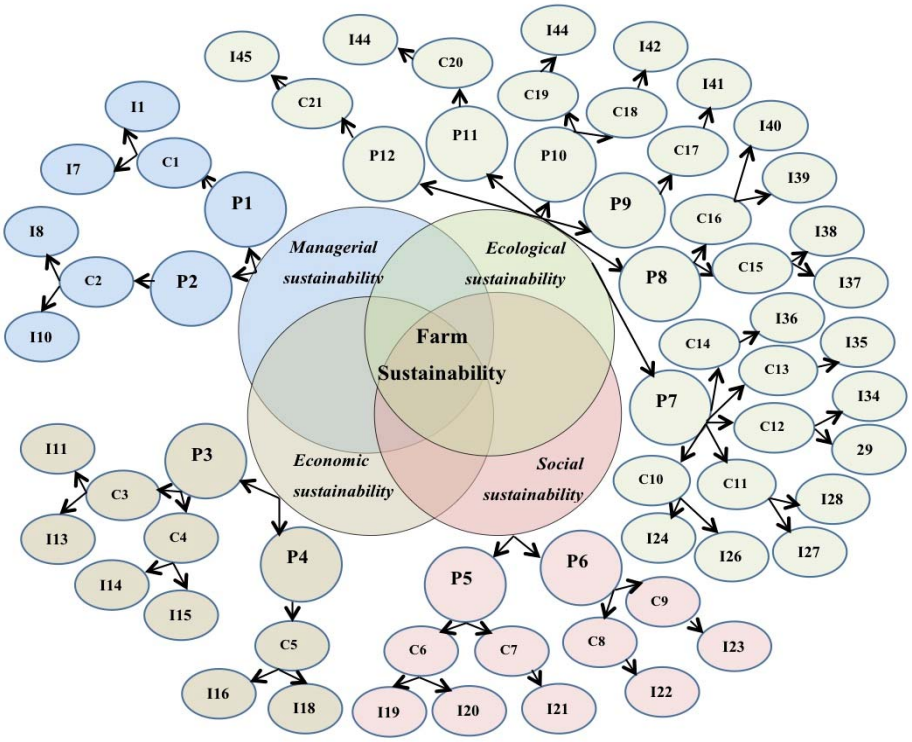
to preservation of agrarian resources and traditions, amelioration of wellbeing and life style of farm households, and development of rural communities and the society as a whole;

• environmental sustainability – to have good or high eco-efficiency of activity, which is to be associated with necessary conservation, recovery and improvement of components of natural environment (landscape, lands, waters, biodiversity, atmosphere, climate, ecosystem services, etc.) and the nature as a whole, respecting welfare of farm and wild animals, etc.

The framework for assessing sustainability of Bulgarian farms has to include hierarchical system of 12 Principles, 21 Criteria, 45 Indicators and Reference values (Figure 1)[1].

Figure 1

Hierarchical Framework for Assessing Sustainability of Bulgarian Farms*



* P – Principle; C – Criterion; I – Indicator.

[1] The specific content, justification, modes of selection, calculation and integration of all elements of that framework are presented in details in another publication of the author (Bachev, 2016).

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

The sustainability of individual farms is based on the estimates of the farm 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". Qualitative estimates for individual farms are quantified and transformed into Sustainability Index 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".

The classification of farms according to production specialization, ecological and administrative locations is based on the official typology for the farming holdings in Bulgaria. Every manager self-determines his/her farming enterprises as: Predominately for Subsistence, rather Small, Middle size or Big for the sector, and located mainly in Plain, Plain-mountainous or Mountainous region. The latter approach guarantees an adequate assessment since the farms' managers are well aware of the specificity and comparative characteristics of their holdings in relations to others in the region and (sub)sector.

For an integral assessment of sustainability of the farm for each Criterion, Principle, Aspect, and for the 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 Indexes for the individual Criteria (SI(c)), Principle (SI(p)), Aspect (SI(a)), as well as the Integral Sustainability Index (SI(o)) are calculated by following formulas:

$SI(c) = \sum SI(i)/n$ n - number of the Indicators in a particular Criterion

$SI(p) = \sum SI(c)/n$ n - number of the Criteria in a particular Principle

$SI(a) = \sum SI(p)/n$ n - number of the Principles in a particular Aspect

$SI(o) = \sum ИУ(a)/4$

For interpretation of the quantitative levels the following sustainability levels of farms are distinguished by a Panel of Experts: "High" – range between 0,84 and 1, "Good" – range between 0,5 to 0,82, "Low" – range 0,22 to 0,49, and "Non-sustainable" – between 0 and 0,2.

The overall and the particular (Aspect, Principle, Criterion, Indicator) sustainability indexes of farms of a specific kind of a Natural Persons (size, specialization, location) are an arithmetic average of the Indexes of individual holdings in that particular group.

Overall characteristics of surveyed farms

The survey with the farms of Natural Persons includes 152 mangers of such holdings, which comprises around 0,2% of all registered under 1999 Regulation No 3 for creation and maintaining a Registry of Agricultural Producers in Bulgaria (MAF, 2015). Managers of representative farms of all major types have been questioned – holdings of different size, specialization and location (see theTable). The type structure and the importance of surveyed farms approximately corresponds to the real structure of Natural Persons in Bulgaria.

Table

Characteristics of Surveyed Farms of Natural Persons

Type and specialization	Share	Location	Share
Mainly subsistence	11,18	Mainly plain region	51,97
Small for the sector	57,89	Plain-mountainous region	19,74
Middle size	28,95	Mainly mountainous region	14,47
Big size for the sector	1,32	Lands in protected zones and territories	6,58
Field crops	10,53	Mountainous regions with natural handicaps	15,13
Vegetables, flowers, and mushrooms	13,82	Non-mountainous regions with natural handicaps	1,97
Permanent crops	24,34	North-West region	15,79
Grazing livestock	17,76	North-Central region	21,05
Pigs, poultry, and rabbits	0,66	North-East region	15,13
Crop-livestock	14,47	South-West region	14,47
Mix crops	13,82	South-Central region	19,74
Mix livestock	4,61	South-East region	13,82

Source. Survey with managers of farms, July 2016.

The owners and/or managers of 72,4% of surveyed farms are male, and the rest are female, while holdings of partnership or group ownership are not reported. Almost 82% of surveyed farmers are up to 55 years of age and merely 2,4% are above 65. Such gender and age structure of managers (owners) will manage the majority of Bulgarian farms in the coming years and will contribute to one or another sustainability level of holdings.

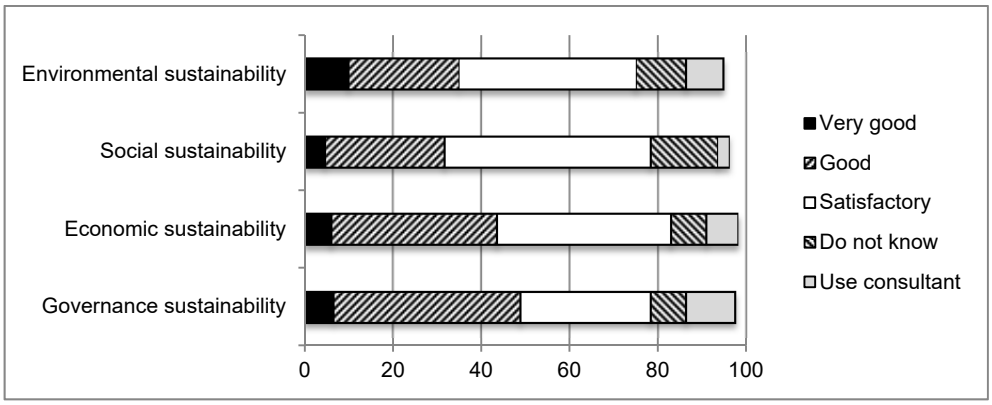
A little more than a half of surveyed farms are with a relatively short period of existence up to 5 year, including around 16% of them “less than two years”. The majority of holdings however, are with a longer period of operation, including around 28% between 6 and 10 years, and the remaining 17% with 11 and more years of effective experience in management of farming sustainability. A little more than 60% of surveyed farms indicate, that the period they put efforts for improving sustainability of farms is up to 5 years. Another significant part of them have a long-term experience in improving farm sustainability, including 11% with 11 and more years.

Awareness of and respecting the major principles of sustainable agriculture is a base for the effective management of farm sustainability. According to the majority of farmers they know Well or Very Well the principles of governance and

economic sustainability (Figure 2). At the same time, most holdings acknowledge that their knowledge of principles of social and environmental sustainability is Satisfactory or entirely Absent. A small portion of Natural Persons increase their capability for management of sustainability through hiring a consultant, as the biggest share of this mode is as far as governance, environmental and economic sustainability is concerned. Therefore, more efforts are to be directed to improving competence of farms with a limited knowledge of the principles of agrarian sustainability through education, training, consultation, advices, exchange of positive experiences, etc.

Figure 2

Extent of Knowledge of Principles of Farm Sustainability by Holdings of Natural Persons (%)



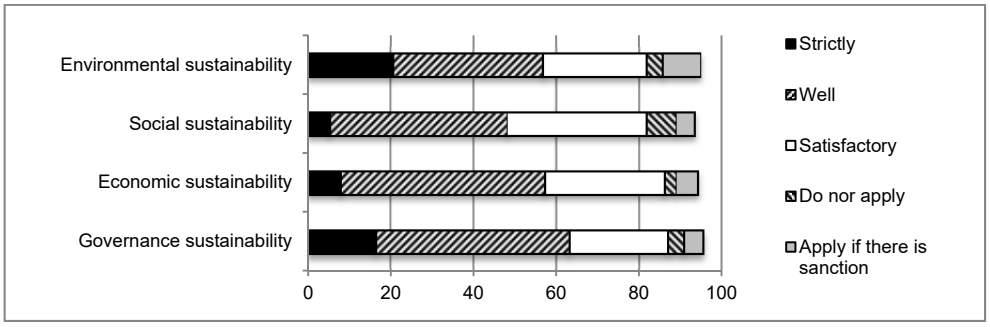
Source. Survey with managers of farms, July 2016.

Due to incomplete knowledge and other economic, technological, agronomical, and behavioral reasons, and in different periods of time, farmers not always apply strictly the principles of sustainable agriculture. According to most of the farm managers the principles of governance, economic, and environmental sustainability (Figure 3) are applied Strictly or Well. Nevertheless, a significant fraction of holdings respect these principles only in a Satisfactory manner. What is more, some holdings indicate that they do not respect such principles at all (mostly for social sustainability), or respect such principles merely if sanctions are applied (reaching above 9% for environmental sustainability). All these data indicate, that sanctions by the state, local authority, communities, etc. induce business behavior for amelioration of sustainability, particularly as far as environmental aspect is concerned.

The share of farms respecting well or strictly the multiple principles of agrarian sustainability is larger than the portion of holdings which know well or very well these principles. Therefore, it is questionable how some farms apply effectively principles, which they do not know well.

Figure 3

Extent in which Farms of Natural Persons Implement Principles of Sustainable Agriculture (%)

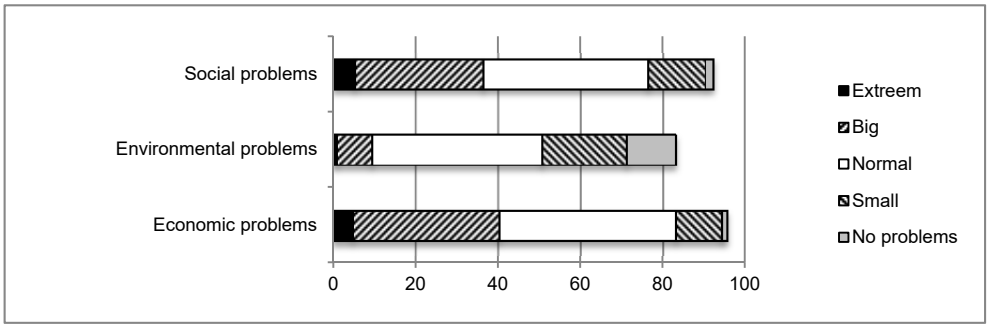


Source. Survey with managers of farms, July 2016.

The survey has found out that the majority of farms are located in regions with "Normal" economic, social and environmental problems (Figure 4). However, a significant part of holdings are in regions with "Big" or "Extreme" economic, social and environmental challenges. A good portion of the managers are not aware of the characteristics or are not able to assess the level of socio-economic and environmental problems in the region, where their farm is located. The latter concerns more than 17% of Natural Persons in regard to their competence on environmental problems.

Figure 4

Characteristics of Problems in the Region, where Surveyed Farm of Natural Person is Located (%)



Source. Survey with managers of farms, July 2016.

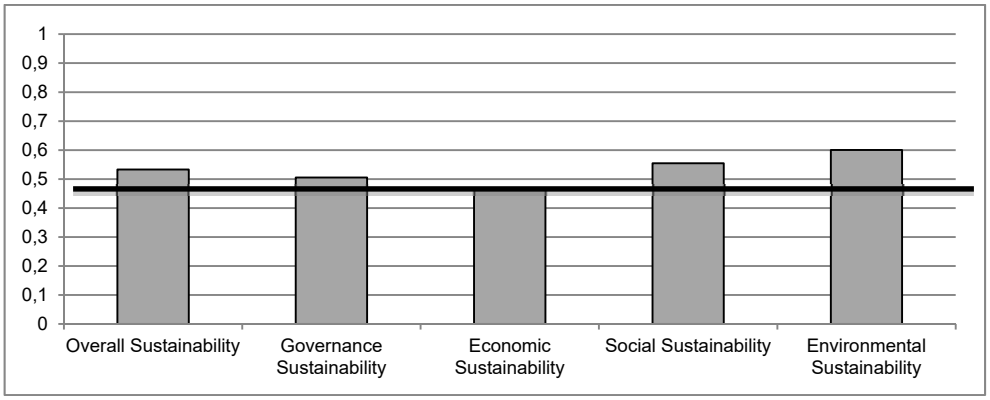
Level of sustainability of farms of Natural Persons

Multi-indicator assessment of sustainability level of farms of Natural Persons indicates, that the Integral Sustainability Index is 0,53, which represents a *good* level of

sustainability of holdings (Figure 5). With the highest levels are Indexes of Environmental (0,6) and Social (0,55) Sustainability of holdings, while Index of Governance (0,51) Sustainability is at the border with a low level. What is more, Natural Persons are with a low economic sustainability, which demonstrates that improvement of the latter one is critical for maintaining the overall sustainability of farms of that type.

Figure 5

Indexes of Integral, Governance, Economics, Social and Environmental Sustainability of Farms of Natural Persons

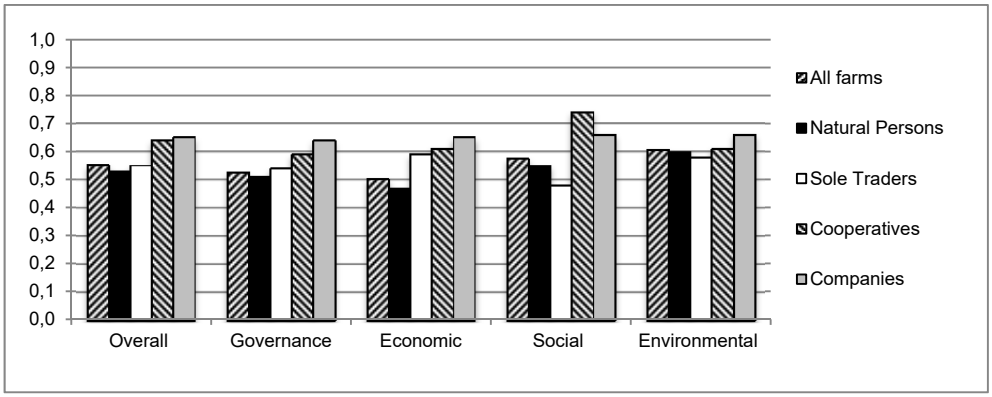


Source. Survey with managers of farms, July 2016.

Comparative sustainability of the farms of Natural Persons is lower than the average sustainability of farms in the country and the levels of other juridical types of farms in agriculture (Figure 6).

Figure 6

Sustainability of Farms with Different Juridical Types in Bulgaria

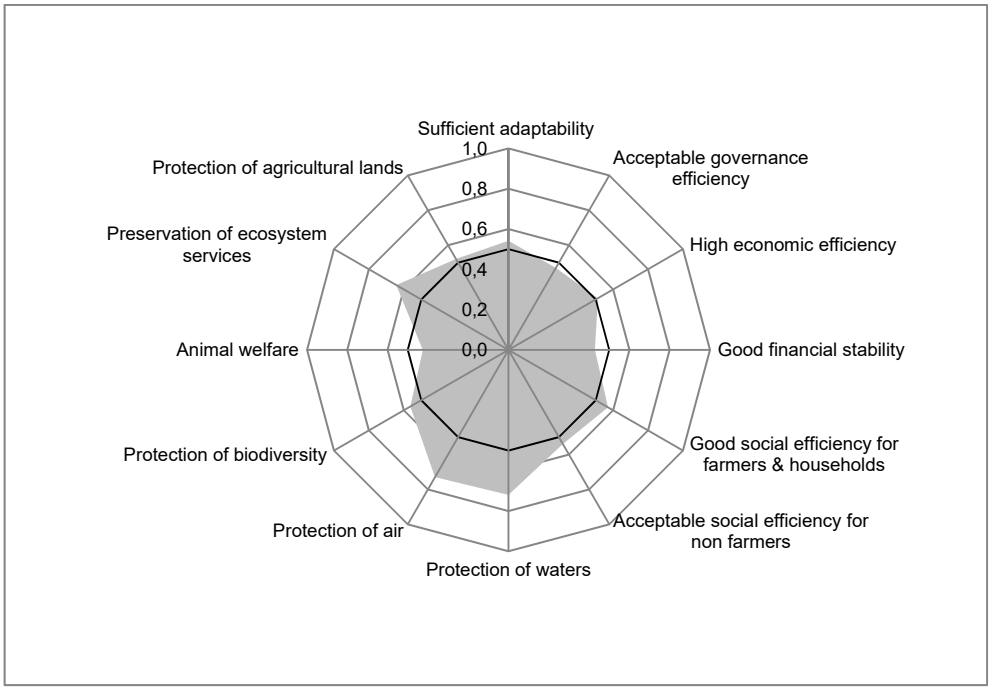


Source. Survey with managers of farms, July 2016.

Sustainability level of Natural Persons only approximates the level of the Sole Traders and it is much inferior to the level of the Companies and the Cooperatives. However, while governance and economic sustainability of the Natural Persons is lower from all categories of farms, in the social and environmental aspects it is superior to the Sole Traders, and in the environmental close to the cooperative farms.

Figure 7

Indexes of Sustainability of Natural Persons for Major Principles for Governance, Economics, Social and Environmental Sustainability



Source. Survey with managers of farms, July 2016.

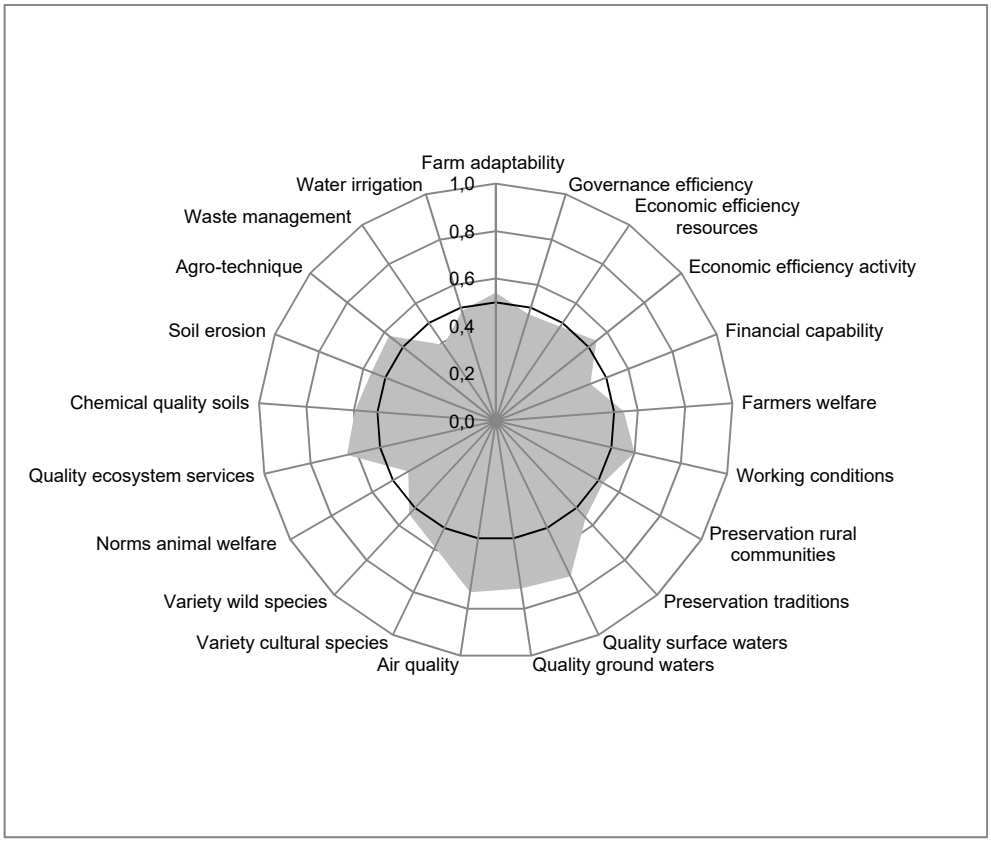
Analysis of the individual Indexes for major sustainability Principles, Criteria and Indicators let identify components contributing to sustainability levels for diverse aspects of sustainability of holdings of Natural Persons. For instance, the economic sustainability of farms is low because of the fact that the Index of Financial Stability (0,47) of these holdings is low (Figure 7). Similarly, the inferior level of the Index of Governance Efficiency (0,49) is responsible for the marginal level of governance sustainability of these farms. It is also clear that nevertheless the overall environmental sustainability of holdings is relatively high, the Index of

Respecting Animal-Welfare Principle (0,43) is low, and the Index of Preservation of Agricultural Lands is marginal (0,52). Improvement of the latter two is critical for maintaining the achieved level.

The in-depth analysis for the individual Criteria and Indicators further specifies the elements, which enhance or reduce the sustainability level of farms. For instance, insufficient Financial Stability is determined by the low Financial Capability (0,43), which is predetermined by the unsatisfactory Profitability of Own Capital (0,36), Overall Liquidity (0,44), and Financial Autonomy (0,48) (Figure 8 and Figure 9).

Figure 8

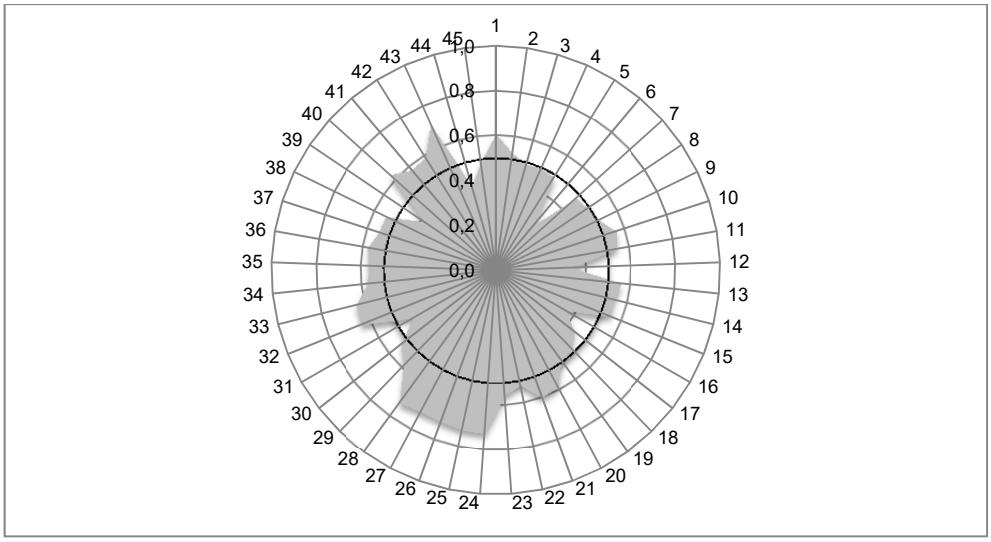
Level of Sustainability of Natural Persons for Individual Criteria for Governance, Economics, Social and Environmental Sustainability



Source. Survey with managers of farms, July 2016.

Figure 9

Indicators* of Assessing Sustainability of Farms of Natural Persons



* 1 – Level of Adaptability to Market Environment; 2 – Level of Adaptability to Institutional Environment; 3 – Level of Adaptability to Natural Environment; 4 – Comparative Efficiency of Supply and Governance of Labor Resources; 5 – Comparative Efficiency of Supply and Governance of Natural Recourses; 6 – Comparative Efficiency of Supply and Governance of Short-term inputs; 7 – Comparative Efficiency of Supply and Governance of Long-term Inputs; 8 – Comparative Efficiency of Supply and Governance of Innovation; 9 – Comparative Efficiency of Supply and Governance of Finance; 10 – Comparative Efficiency of Governance of Marketing of Products and Services; 11 – Land productivity; 12 – Livestock Productivity; 13 – Level of Labor productivity; 14 – Rate of Profitability of Production; 15 – Income of Enterprise; 16 – Rate of Profitability of Own Capital; 17 – Overall Liquidity; 18 – Financial Autonomy; 19 – Income per Farm – household Member; 20 – Satisfaction of Activity; 21 – Compliance with Working Conditions Standards; 22 – Contribution to Preservation of Rural Communities; 23 – Contribution to Preservation of Traditions; 24 – Nitrate Content in Surface Waters; 25 – Pesticide Content in Surface Waters; 26 – Nitrate Content in Ground Waters; 27 – Pesticide Content in Ground Waters; 28 – Extent of Air Pollution; 29 – Number of Cultural Species; 30 – Number of Wild Species; 31 – Extent of Respecting Animal Welfare; 32 – Extent of Preservation of Quality of Ecosystem Services; 33 – Soil Organic Content; 34 – Soil Acidity; 35 – Soil Soltification; 36 – Extent of Wind Erosion; 37 – Extent of Water Erosion; 38 – Crop Rotation; 39 – Number of Livestock per ha of Farmland; l40 – Norm of Nitrogen Fertilization; 41 – Norm of Phosphorus Fertilization; 42 – Norm of Potassium Fertilization; 43 – Extent of Application of Good Agricultural Practices; 44 – Type of Manure Storage; 45 – Irrigation Rate.

Source. Survey with managers of farms, July 2016.

Most sustainability indicators of the Natural Persons are low and lead to a decrease in sustainability for individual aspects and the overall level of farms. In the governance aspect of sustainability of these holdings the Levels 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 (0,49) and Innovations (0,49) are inferior and the Comparative Efficiency of Supply and Governance of Short-term Inputs (0,26) are extremely low.

In the economic aspect the sustainability of Natural 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 the social aspect sustainability of these holdings is only low in relation to the Income per Farm-household Member (0,49), while in the environmental plan in respect to complying with norms for Number of Livestock per ha of Farmland (0,43), Type of Manure Storage (0,39), Extent of Respecting Animal Welfare (0,43), and Irrigation Rate (0,49). Therefore, in all these directions adequate measures have to be taken by the managers of farms and the state authority in order to improve the aspect and the overall sustainability of the Natural Persons.

At the same time, a number of indicators for the environmental sustainability of Natural Persons are with relatively high positive positions within a good level like: 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 the Natural Persons are to be maintained and enhanced, while other indicators for the eco-efficiency increased in order to preserve and increase the aspect and the overall sustainability of farms.

The low levels of indicators identify the specific areas for improvement of sustainability of farms through adequate changes in management strategy of enterprises and/or public policies for farming structures. For instance, despite that the overall Adaptability of Farms is relatively high (0,54), the Adaptability of Farms to Changes in Natural Environment (climate, extreme events, etc.) is low (0,49). 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.

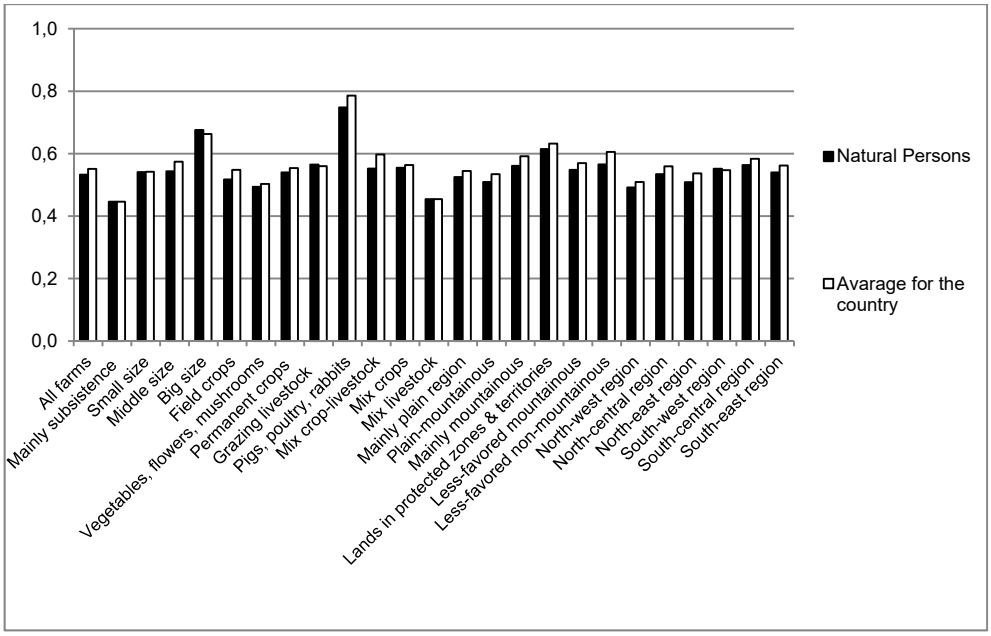
On the other hand, the superior levels of certain indicators show the absolute and comparative advantages of the farms of Natural Persons related to sustainable development. At the current stage of development the latter are associated with good the eco-efficiency associated with Preservation of Quality of Surface and Ground Waters from contamination with nitrates and pesticides, Preservation of Air Quality and Quality of Eco-system Services, extent of implementation of Good Agricultural Practices, Preservation of Soil Organic Content, application of recommended Norms of Nitrogen Fertilization, good Adaptability to Market (prices, competition, demands, etc.), and Acceptable Working Conditions.

Sustainability of holdings of Natural Persons of different kind

There is significant variation in the sustainability of Natural Persons depending on their size, production specialization, and ecological and geographical location (see Figure 10).

Figure 10

Sustainability Index of Farms of Natural Persons of Different Kind and Location



Source. Survey with managers of farms, July 2016.

With the highest sustainability, within a good level, are the holdings of Natural Persons with the 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 a low sustainability are the Natural 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 the sustainability of the Natural Persons situated in the Plain-mountainous Regions of the country.

Holdings of the Natural 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 Natural Persons of different kind deviates insignificantly from the average sustainability levels of the respective categories of farms in the country. Simultaneously, considerable variation of the sustainability of Natural Persons depending on their kind indicates that the size, product specialization and location of these holdings are more important factors for their sustainability than their juridical status.[2]

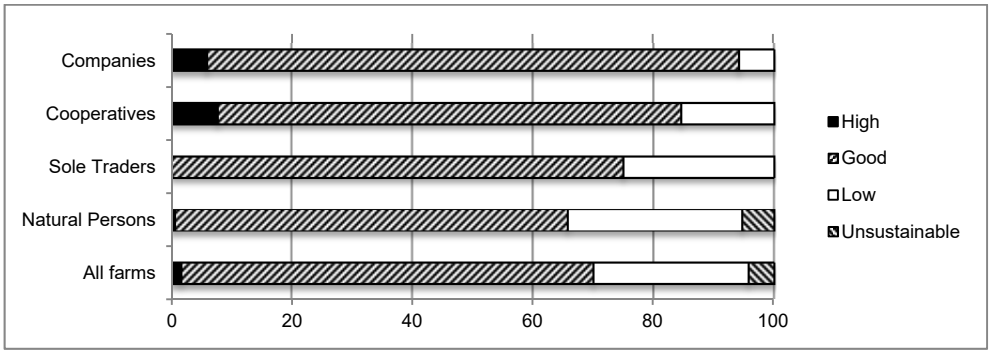
[2] That is also the case with certain types of firms - e.g. those with Big size for the sector, specialised in Grazing Livestock, etc. On the other hand, for the Cooperatives, the specific juridicial (and governance) form is

Structure of farms of Natural Persons with different sustainability levels

The overall and the partial sustainability levels of the Natural Persons do not give a full picture about the state of all holdings since there is a great variation in the share of farms with different sustainability levels. Almost two-third of farms of Natural Persons in the country are with a good sustainability and only under 1% with a high sustainability (Figure 11). At the same time, more than a third of all Natural Persons (34%) are with a low sustainability or unsustainable at all (5%).

Figure 11

Structure of Farms of Different Juridical Type with Different Sustainability Level (%)



Source. Survey with managers of farms, July 2016.

The share of Natural Persons with a low sustainability is much bigger of portion of holdings with such a level in other juridical types, as unsustainable are inclusively that group of holdings. The greatest is the share of farms with a good and high sustainability in the group of the Companies, followed by the Cooperatives and the Sole Traders, as every forth of the Sole Traders is with a low sustainability level, similarly to 15% of the Cooperatives, and 6% of the Companies. Above figures demonstrate comparative advantages of other juridical (and governance) type of enterprises compared with the Natural Persons in regard to sustainable development. They confirm well-known trend for constant reduction in number and importance of Natural Persons in the structure of Bulgarian farming enterprises during last two decades (Bachev, 2011).

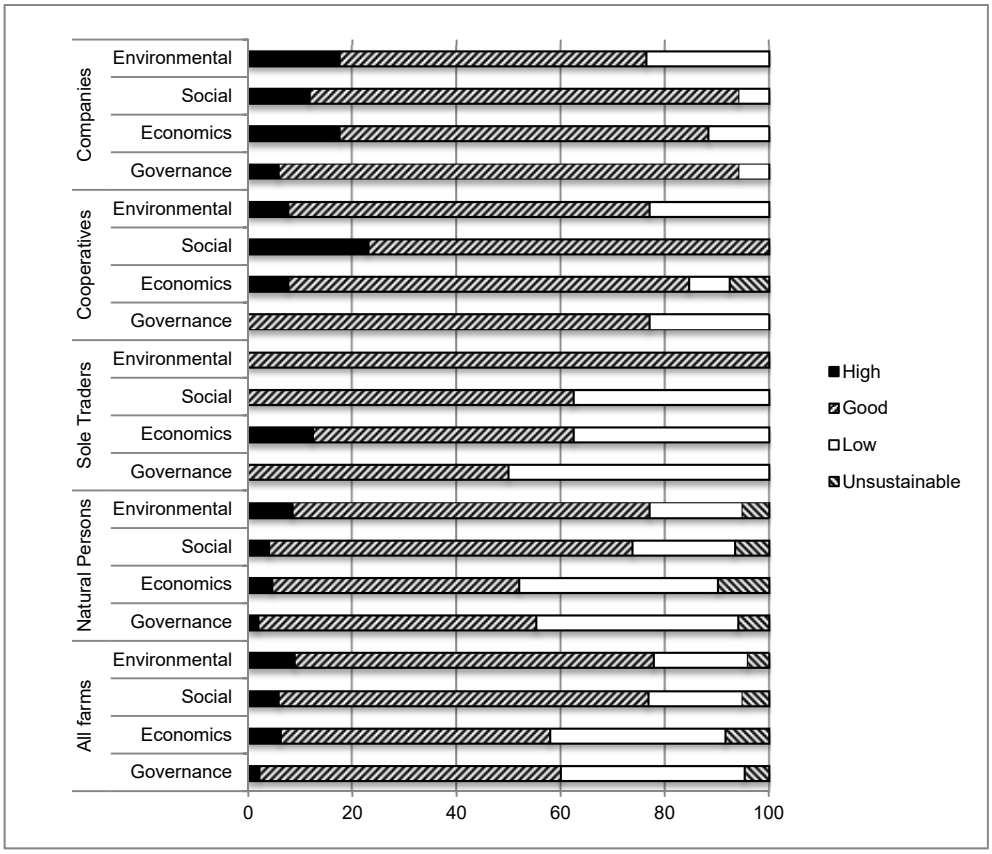
The analysis of the structure of farms with different level of sustainability for each sustainability aspect gives important information about the long-term sustainability of the Natural Persons as well as the factors for its improvement. Our assessment shows that 45% of the surveyed Natural Persons are with a low governance sustainability or managerially unsustainable (Figure 12). That means that comparative efficiency

a critical factor determining sustainability level, rather than their belogning to a particular categogy of enterprises in the country (Bachev, 2017).

(potential) for governing supply of labor, land, finance, etc. and marketing of produce is lower than another feasible organization, and that adaptability to evolving environment is insufficient. Furthermore, 48% of all Natural Persons are with a low economic sustainability or unsustainable at all (each tenth one). All that means that a considerable part of the farms of Natural Persons are with insufficient governance and economic sustainability for meeting contemporary socio-economic, market, institutional and environmental challenges, and they will cease to exists in the near future unless adequate measures are undertaken (modernization, reorganization, public support, regulations, etc.) for their improving sustainability.

Figure 12

Structure of Farms of Different Type with Different Level of Governance, Economic, Social and Environmental Sustainability (%)



Source. Survey with managers of farms, July 2016.

The portion of the Natural Persons with inferior economic and governance sustainability is higher than the Cooperatives and the Companies, and in regard to the

economic sustainability exceeds the Sole Traders as well. Thus, in the near future management of resources of (a great portion of) economically and managerially low sustainable and unsustainable holdings of the Natural Persons most likely will be transferred to the organizations with higher comparative advantages (efficiency, sustainability) of another juridical type and/or Natural Persons with higher sustainability.

As far as the social aspect of sustainability is concerned, the structure is more favorable and the majority of farms of the Natural Persons surveyed farms are with a good or high social sustainability. Despite that, more than a quarter of holdings are with a low social sustainability or socially unsustainable. Only the share of Sole Traders with inferior levels of social sustainability is bigger. That demonstrates that social efficiency of holdings of Natural Persons for farmers, communities and society do not correspond to contemporary requirements and standards. A good portion of these farms currently are with a low social sustainability or socially unsustainable, which compromises their overall middle and long-term sustainability. Therefore, effective measures have to be undertaken immediately to improve income, labor and living conditions of farmers and farm households as well as their importance for preservation of rural communities and traditions.

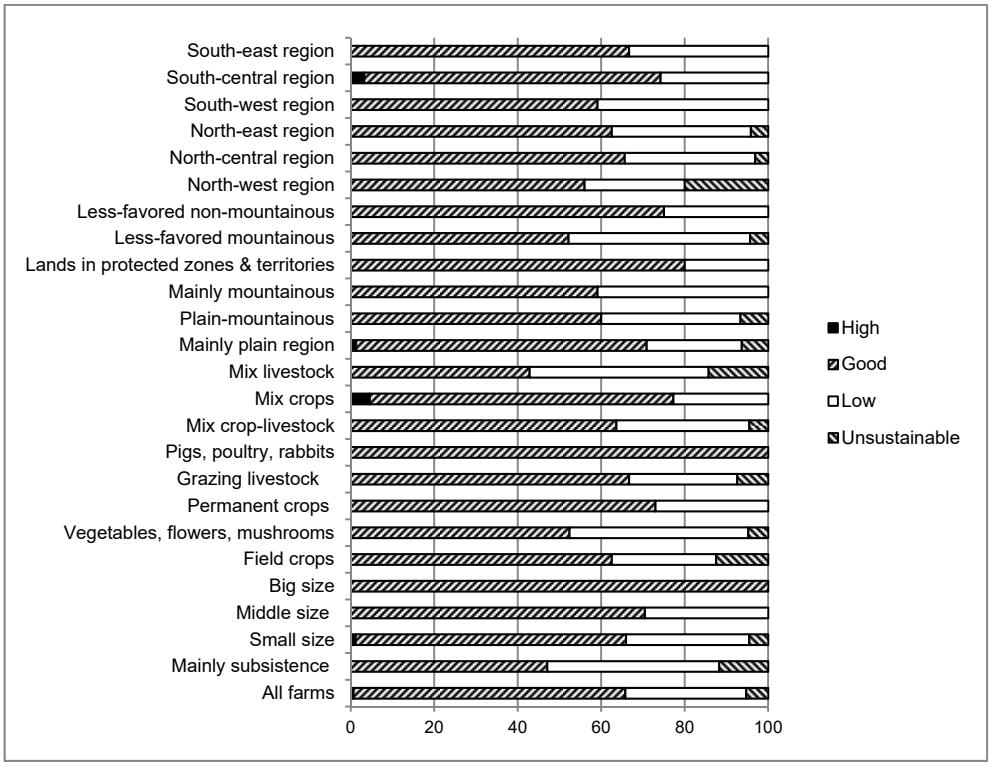
Environmental sustainability of the majority of farms of Natural Persons is good or superior, while a considerable portion is with a low sustainability (18%) or even environmentally unsustainable (5%). The share of these farms with inferior eco-efficiency is similar to those for Cooperatives and Companies, and gives a way only to Sole Traders. Nevertheless, above figures show, that the eco-efficiency in a large number of the Natural Persons in the country do not meet contemporary norms and standards for preservation of agricultural lands, waters, air, biodiversity, ecosystem services, and animal welfare. A good number of the Bulgarian farms are with a low eco-sustainability or environmentally unsustainable, which also compromises their overall long-term sustainability. Therefore, effective measures have to be taken to improve eco-efficiency in these groups through training, informing, stimulation, sanctions, etc.

There is also a significant differentiation in the share of farms with different level of sustainability for the major types of the Natural Persons (Figure 13). All Natural Persons with the Big size for the sector and those specialized in Pigs, Poultry and Rabbits, and most of these specialized in the Mix Cops and the Permanent Crops, and located in the 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, the majority of Natural 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 Natural 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 North-West and South-Wets Regions of the country.

Figure 13

Structure of Natural Persons of Different Type with Different Sustainability Level (%)



Source: Survey with managers of farms, July 2016.

Above-mentioned data for dispersion of farming holdings of different type in groups with diverse level of sustainability have to be taken into account when forecasting the number and importance of holdings of Natural Persons of each kind and location, as well as when modernize public (structural, sectorial, regional, environmental, etc.) policies for supporting agricultural producers of certain type, sub-sectors, eco-systems, and regions of the country.

Factors for Sustainability of Farms of Natural Persons

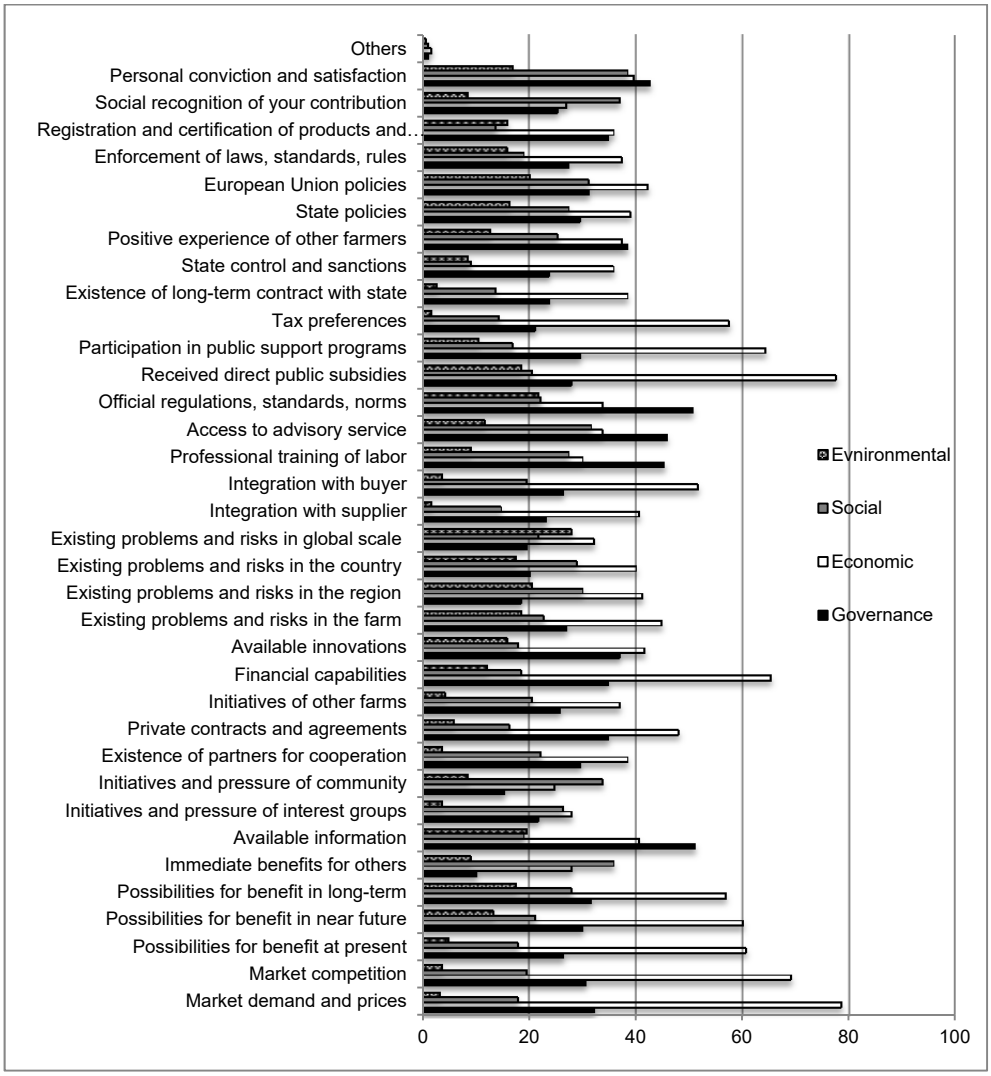
Diverse social, economic, market, ideological personal, etc. factors in various extent stimulate or restrict activities of the holdings of Natural Persons for sustainable operations and development.

According to the managers of surveyed farms, the factors which to the greatest extent stimulate their actions for increasing *governance sustainability* of holdings are: Official Regulations, Standards and Norms, Available Information, Access to Advisory

Services, Professional Training of Manager and Hired Labor, Personal Conviction and Satisfaction, Positive Experience of Other Farms, Available Innovations, Financial Capability, Private Contracts and Agreements, and Registration and Certification of Products, Services, etc. (Figure 14).

Figure 14

Factors Mostly Stimulating Actions of Farms of Natural Persons for Improving Sustainability (%)



Source. Survey with managers of farms, July 2016.

Factors which to the greatest extend stimulate actions of most farms for improving *economic* sustainability are: Market Demand and Prices, Received Direct State Subsidies, Market Competition, Financial Capability, Participation in Public Support Programs, Possibilities for Benefits in the Present Moment, Possibilities for Benefits in Near Future, Tax Preferences, Possibilities for Benefits in the Long-run, and Integration with Buyer of Product.

For the biggest part of the farms the factors which to the greatest extent stimulate their actions for enhancing *social* aspect of sustainability are: Personal Conviction and Satisfaction, Social Recognition of Contribution, Immediate Benefits for Other Persons and Groups, Community Initiatives and Pressure in Region, Access to Advisory Services, Policies of the European Union, and Existing Problems and Risks in the Region.

Factors which to the greatest extent stimulate farming enterprises for increasing *environmental* sustainability are: Existing Problems and Risks in Global Scale, Official Regulations, Standards, Norms, etc., Existing Problems and Risks in the Region, and Policies of the European Union. All these specific incentives for the farms of Natural Persons have to be taken into account in the process of modernization of public policies and the programs for sustainable development.

Our survey has found out that public policies relatively weakly affect the governance sustainability of the farms of Natural Persons. The national and European Union mechanisms of regulation and support, which to the greatest extent increase governance sustainability of surveyed holdings are: Professional Training and Advices, Obligatory Standards, Norms, Rules and Restrictions, Modernization of Agricultural Holdings, and Setting up Produces Organizations.

Diverse mechanisms of public support to the greatest extent improve economic sustainability of farms of Natural Persons in the country. The instruments, which impact the economic sustainability of the most part of the surveyed holdings are: Direct Area Based Payments, National Top-ups for Products, Livestock, etc., Modernization of Agricultural Holdings, Green Payments, Support to Semi-market Farms.

The impact of the national and the European policies on social and environmental sustainability of Bulgarian farms is relatively the smallest. The instruments, which augment social sustainability of the most farms are: Strategies for Local Development, Services to Residents of Rural Areas, Restoration and Development of Residential Areas, and Stimulation of Rural Tourism. For improving environmental sustainability of the farms the most important are: Green Payments, Support to Organic Farming, Obligatory Standards, Norms, Rules and Restrictions, and Agro-environmental Payments.

All these data for real impact of individual mechanisms and instruments of public support on different aspect of sustainability of farms of Natural Persons are to be taken into account when improving the support policies and programs in the sectors and the holdings of diverse type and location.

According to the surveyed the share of male-managers whose holdings are with a “good or high” sustainability is significant (67,3%) and bigger than of the female

managers (57,1%). The high levels for the indicator for both genders indicate that there are no significant differences in regard to sustainable management of the farms.

There is a strong correlation between the age of the manager and the sustainability of farm, as the highest is the portion of holdings with a superior sustainability of the managers-young farmers up to 40 (8,6%). Relatively smaller share of the managers between 56 and 65 with a good and high sustainability of the holdings shows, that the latter category either focus on the pure economic vitality of the enterprises (a strategy for profiting or survival) or they are not interested in a long-term sustainability (due to a plan for exit farming activity, lack of a heir ready to undertake the farm, etc.).

The estimates on the links between he sustainability of farms and the nature of the problems in the region, where the holding is located, demonstrate that the greatest share of farms of Natural Persons with a good or high sustainability are in the regions with “great or extreme economic problems”, with “normal social problems”, and with “low or without ecological problems”. Therefore, the levels of sustainability of farms depend primarily on the managerial capability and the strategy of managers for solving socio-economic problems as well as on the ecological characteristics (advantages challenges, risks) in the region where the holding in located.

There is also a strong correlation between the levels of competence of the farm managers and respecting the principles of governance, economic, social and environmental sustainability, and the levels of sustainability of farms of Natural Persons. For all aspects of sustainability there is an enormous portion of farms with a good and high sustainability, which know and implement well or very well the principles of sustainable agriculture. Therefore, increasing competence, culture and practices of sustainable farming is a crucial factor for improving sustainability of holdings of Natural Persons.

The analysis of responses of the surveyed farms found out that, the biggest share of holdings with a good and high sustainability is among the farms with a longer period of existence and implementing actions for improving sustainability – with maximum values for the holdings with a period between 11 and 15 years (respectively 69,2% and 81,8%). The latter proves that sustainable farming requires a long-term strategy and targeted actions for amelioration of individual aspects of sustainability. Relatively smaller fraction of holdings with a good and high sustainability among those, taking actions more than 15 years is probably a consequence of a lack of effective modernization in strategies corresponding to constantly changing socio-economic, institutional and natural environment in the past years.

Our analysis also found out a big share of farms with a good and high sustainability for all instruments of policies, which according to the managers to the greatest extent increase governance, economic, social, and environmental sustainability of their holdings. A strong correlation between the extent of public support and the level of sustainability of farms of Natural Persons has also been found out. The political mechanisms and instruments, which to the greatest extent have actually affected sustainability of most of the supported farms are: in respect to governance

sustainability – National Top-ups for Products, Livestock, etc.; in respect to social sustainability – "Green" Payments, and Professional Training and Advisory Service; in relation to environmental sustainability – Modernization of Agricultural Holdings, in regard to governance, social and environmental sustainability – Adding up Value for Agricultural and forestry Products, Natural Handicap Payments to Farmers in Mountain Areas and Non-Mountainous Regions, Agro-environmental Payments, Support to Organic Farming, and Diversification toward Non-agricultural Activities.

*

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

Suggested holistic framework gives a possibility to assess, analyze and improve sustainability level of individual farms and enterprises of different types in general and for the major aspects, principles, criteria and indicators of sustainability. Furthermore, different degrees of aggregations allow assessment results to be effectively used at various decision-making levels – from the lowest (individual enterprise) to the highest (policy making). That approach has to be further discussed, experimented, improved and adapted to the specific conditions of operation and development of farming enterprises of different types and location, as well as special needs of decision-makers at various levels.

The overall sustainability of the Natural Persons in the country is at a good level, with superior levels for environmental and social sustainability, close to the border with low-level governance sustainability, and inferior economic sustainability. Furthermore, comparative sustainability of these holdings as a whole and for individual aspect is lower than the average sustainability of enterprises in the country and from the level of other juridical (governing) type. There are also great variations in sustainability levels of farms of different kinds and location. Besides, the share of Natural Persons with good and high sustainability is much smaller than other categories of enterprises. All that means that the majority of Natural Persons do not have comparative advantages in relations to efficiency and sustainability, and in a middle term will cease to exist transferring management of resources into more-efficient and sustainable structures.

Having in mind the importance of such comprehensive assessments of the levels and the factors of sustainability of farms, and the enormous benefits for farm management and agrarian policies, such studies are to be expended and their precision and representation to be increased. The latter require a close cooperation between all parties concerned and participation of farmers, agrarian organizations, local and state authorities, interest groups, research institutes and experts, etc. Moreover, precision of estimates has to be improved and based, in addition to the

assessments of the managers, on other relevant information from field tests and surveys, statistical and other data, and expertise of professionals in the area.

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