Framework for assessing the governance pillar of agrarian sustainability

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Framework for Assessing the Governance Pillar of Agrarian Sustainability

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Abstract

In many other countries, there are no comprehensive systems for assessment of the governance sustainability of agriculture and its importance for the overall agrarian development. This study tries to fill the gap and suggests a holistic framework for understanding and assessing the governance sustainability. The newly elaborated approach is "tested" in a large-scale study for assessing the governance sustainability of Bulgarian agriculture. The study has proved that it is important to include the "missing" Governance Pillar in the assessment of the Integral sustainability of agriculture and sustainability of agro-systems of various type. Assessment of the Governance sustainability of Bulgarian agriculture indicates that the Overall Governance Sustainability is at a "Good" but close to the "Satisfactory" level. There is a considerable differentiation in the level of Integral Governance sustainability of different agro-systems in the country. Results on the integral agrarian sustainability assessment based on micro (farm) and macro (statistical, etc.) data show some discrepancies which have to be taken into consideration, while assessment indicators, methods and data sources improved.

Key words: governance sustainability, assessment, agriculture, agricultural systems, Bulgaria

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Introduction

A common feature of all suggested and practically used modern systems for assessing sustainability as a whole and of agro-systems in particular is incorporation of three "dimensions" or "pillars" of sustainability - economic, social and environmental (Bachev et al, 2017; Cruz et al., 2018; EC, 2001; FAO, 2013; Hayati et al., 2010; Kamalia et al., 2017; Lopez-Ridauira et al., 2002; Lowrance et al., 2015; OECD, 2001; Sauvenier et al., 2005; Singh et al., 2009; Terziev et al. 2018; VanLoon et al., 2005). In the last years a special attention has been increasing put on the (good) "governance" as a key for achieving multiple goals of sustainable development at corporate, sectoral, national and international levels (Bachev, 2010; Bosselmann et. al., 2008; Gibson, 2006; EU, 2019; Simberova et al., 2012; Kayizari, 2018; UN. 2015). What is more, the list of sustainability objectives of (theory, policy and practice) of development has been constantly enlarged encompassing numerous governance, cultural, ethical etc. standards and goals (Bachev, 2010; Scobie and Young 2018). Simultaneously "new" (cultural, human, governance, etc.) pillars has been widely added to the modern definition of sustainability and the systems of its evaluation and management (Altinay, 2012; ASA, 2019; Bachev, 2018; Nurse, 2006; RMIT University, 2017; UCLG, 2014).

The need to include "the fourth" Governance pillar in the concept for understanding and the system of measurement of sustainability is increasingly justified in academic literature (Bachev, 2010, 2018; Baeker, 2014; Burford, 2017; Fraser et al., 2006; Monkelbaan, 2017) as well as finds place in the official documents and assessment systems of different (government, international, private, etc.) organizations (City of Brooks, 2019; EU, 2019; IFAD, 1999). The "good governance" is considered to be both a goal of sustainable development and a means to successfully realized diverse socio-economic, ecological, cultural, etc. aspects of sustainability. Accordingly, numerous indicators have been proposed to evaluate the governance aspect of sustainability mostly at national and international level. The later predominately focus on the state of formal institutional framework, content of implemented policies and strategies, quality of human resources development, quality and efficiency of established capacity, efficiency of management of public authorities, extent of stakeholder involvement in public decision-making and control, etc. (Bell and Morse 2008; Bhuta and Umbach, 2014; CoastalWiki, 2019; Ganev et al.,2018; Monkelbaan, 2017; Spangenberg et al., 2002).

Despite enormous progress in that novel direction, the building of the system for understating and assessing the "new" governance aspect (pillar) of overall and agrarian sustainability is a "work in progress". For instance, still there is no general consensus on: whether and how to include the governance as a new pillar of (agrarian) sustainability; how to define the governance (and the overall) agrarian sustainability; what are the relations between the governance sustainability of a farming enterprise and that of agriculture; what are the critical factors of governance (and overall) sustainability; how to formulate, select, measure and integrate diverse sustainability indicators; and how to properly evaluate the level of governance (and overall) sustainability in a dynamic world where hardly anything is actually "sustainable".

Furthermore, most of the suggested approaches for "assessing" governance sustainability are at conceptual and/or "qualitative" level. The few existing systems for governance sustainability measurement are focusing entirely on national and international level (comparison)

without taking into consideration the specificity of the agricultural sector and the multiple and levels of governance and agri-(sub)systems of various types. In many cases, the governance aspect of agrarian (sectoral) sustainability and the farm (enterprise) sustainability are wrongly treated as identical and evaluated in the same way.

What is more, all suggested and practically used systems for governance sustainability assessment contain a list of "universal" indicators equally applicable (appropriate) for the unique (socio-economic, market, institutional, political, natural, etc.) conditions of an individual country, and a quite specific state and diverse factors of agricultural development of each country and community, and the great variety of agricultural systems within a country, region, subsector, eco-system, type of farming organization, etc.

Often the governance sustainability is evaluated on the base of qualitative analysis and "experts" estimates without applying any consistent methodology, reliable (representative, first-hand, micro, etc.) information and data, specific quantitative methods, etc. Commonly a holistic approach for sustainability assessment is not applied, and the "purely" governance, and "purely" economic, and "purely" ecological, and "purely" social aspects of agrarian development are studied (and evaluated) independently from one another. Studding and assessing the governance sustainability is usually restricted to formal institutional environment and/or "official" public modes without taking into account the important market, private, collective, and hybrid forms, and critical (and often dominating in many cases) modes of "informal" governance.

Rarely a hierarchical structure and/or systematic organization for sustainability indicators selection are applied. Principally, the individual components of the governance (and the overall) agrarian sustainability are (pre)determined by a direct and "arbitrary" selection of different indicators for sustainability evaluation. Similarly, a corresponding set of specific "reference values" is not adequately incorporated in the sustainability assessment framework for a particular (national, regional, sectoral, eco-system, farming, etc.) agro-system.

Generally, there is no any system (approaches, priorities, weights, interpretation modes, etc.) for the "integration" of the governance sustainability indicators in different (distinct) areas into an Integral (Overall) governance and sustainability level. The later prevents the proper understanding and assessment the specific role of various aspects of governance sustainability in the overall governance and agrarian sustainability as well as effective improvement ("management") of the governance and the overall sustainability.

Finally, most of the proposed systems of sustainability assessment cannot be practically used by the managerial bodies at different decision-making levels since they are very complex and difficult to understand, calculate, monitor, correctly interpret and used in everyday activity of individual agents, organizations and agencies.

In Bulgaria, like in many other countries, there are a very few studies on governance issues related to agrarian sustainability (Bachev, 2010, 2018; Bachev et al., 2016; Bachev and Treziev, 2018; Georgiev, 2013; Marinov, 2019; Zvyatkova and Sarov, 2018). There are also very few attempts to analyze the governance aspect (pillar) of agrarian sustainability and practically incorporate it into overall sustainability evaluation and measurement (Bachev, 2016, 2017, 2018; Bachev et al. 2018; Bachev and Treziev, 2017, 2019). Moreover, practically there are no comprehensive assessments of the governance sustainability in the agrarian sector and its importance for the overall agrarian sustainability at present stage of development.

This paper tries to fill the gap and suggests a holistic framework for understanding and assessing the governance sustainability of Bulgarian agriculture. The newly elaborated approach is applied (tested) in a first in kind large-scale study for assessing the governance sustainability of

country's agriculture at national, sectoral, regional, eco-system and farm levels, and its contribution to the overall agrarian sustainability in Bulgaria.

1. Proper Understanding of Governance Sustainability of Agriculture

In academic literature, managerial and assessment practices still there is no consensus about "what is" (how to define) agrarian sustainability which is commonly defined as "alternative ideology" (Edwards et al., 1990.; VanLoon et al., 2005); "new strategy" (Mirovitskaya and Ascher, 2001); "characteristic of agrarian system like „ability for achieving multiple goals" (Brklacich et al., 1991; Hansen, 1996) or "capability (potential) for maintain and improve its functions" (Lopez-Ridaura et al., 2002; Lewandowski et al., 1999); "process of understanding and adapting to changes" (Raman, 2006), etc.

We have proved that sustainability of agriculture is a "system characteristic" and has to be perceived as "ability to continue over time" (Bachev, 2005; Hansen, 1996). It characterizes the ability (internal capability and adaptability) of agriculture and ago-systems of different type to maintain its managerial, economic, social and environmental functions in a long period of time (Bachev, 2018). Agrarian sustainability has four major aspects ("pillars") which are equally important and have to be always accounted for – the governance sustainability, the economic sustainability, the social sustainability, and the environmental sustainability. Thus agriculture is sustainable if it is:

- *economically viable and efficient* – i.e. provide enough employment and income for farm and rural households, good or high productivity of utilization of natural, personal, material, and financial resources, economic efficiency and competitiveness, and financial stability of activity;

- *socially responsible regarding farmers, workers, other agents, communities, consumers and society as a whole* - i.e. contribute to amelioration of welfare and living standards of farmers and rural households, conservation of agrarian resources and traditions, and sustainable development of rural communities and society;

- *ecologically sustainable* – i.e. activity is associated with conservation, recovery and improvement of components of natural environment (landscape, lands, waters, biodiversity, atmosphere, climate, etc.), respecting "rights" of farm and wild animals ("animal welfare"), etc.

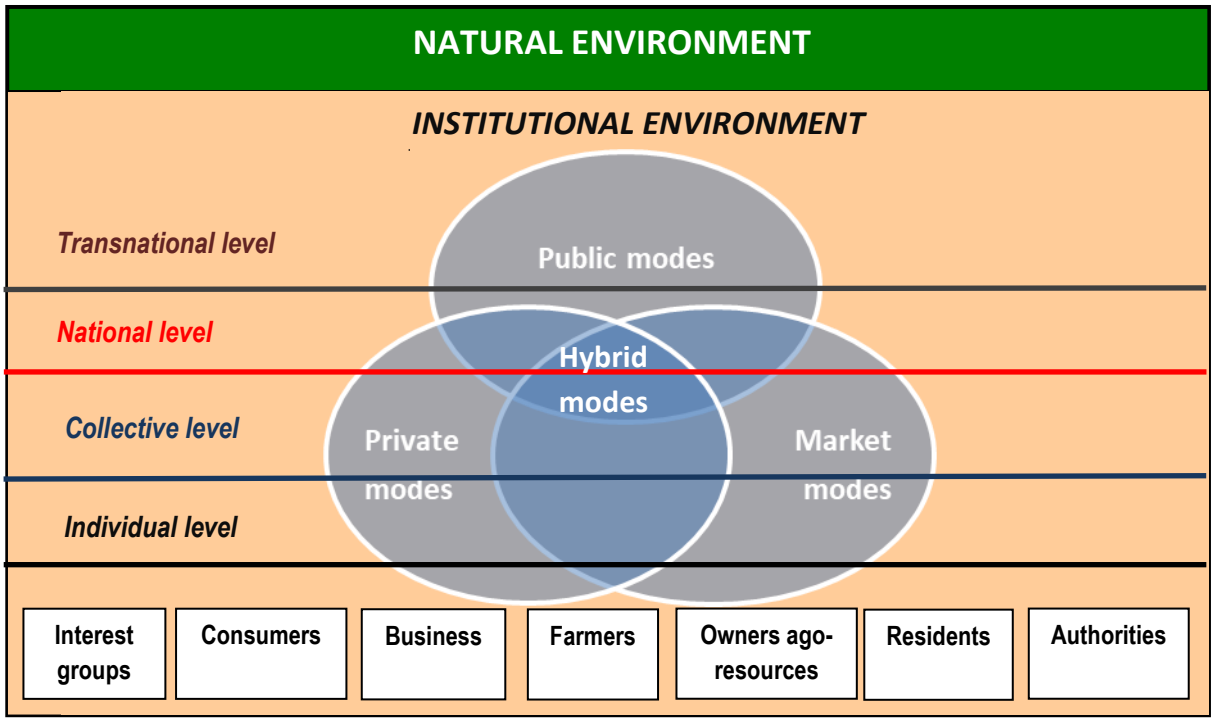
- and *has a "Good" system of governance put in place* – i.e. effective formal and informal institutional rules and public management, working markets, private and collective modes, and adequate enforcement systems, etc.

More particularly, the "governance sustainability" characterizes the efficiency of the specific system of governance in an evaluated agro-system being national, subsector, ecosystem, regional, farming enterprise, etc. Accordingly, a "good governance" means a superior governance sustainability, while a "bad" (inefficient) governance corresponds to inferior governance sustainability. Governance sustainability is simultaneously a major system feature as well as a means to achieve other multiple goals of the system and the "states" of economic, social and environmental sustainability. Having in mind its important role for achieving, maintain and improving the overall agrarian sustainability, it could be underline that the governance sustainability is the "first" (pillar) among (four) "equals".

Maintaining multiple functions (sustainability) of agriculture requires an effective social order - a system of diverse (governing) mechanisms and forms regulating, coordinating, stimulating, and controlling the behavior, actions and relations of individual (agrarian and non agrarian) agents (resource owners, farm managers, labor, input suppliers, buyers of farm

products, investors, interest groups, residents and visitors of rural areas, state, local and agrarian authorities, policy makers, final consumers etc.) at various levels (farm, local, regional, national, transnational, and global) (Figure 1).

Figure 1. Mechanisms and Modes of Agrarian Governance



Source: authors

The system of governance includes a number of district components (governing mechanisms and modes) (Williamoson, 1996) all of which have to be included in the sustainability assessment:

First, *institutional environment* ("rule of the game") - that is the distribution of rights and obligations between individuals, groups, and generations, and the system(s) of enforcement of these rights and rules (North).

Second, *market mechanisms and modes* ("invisible hand of market", "market order") – those are various decentralized initiatives governed by the free market price movements and market competition – e.g. spotlight exchange of resources, products and services; classical purchase, lease or sell contract; trade with high quality, organic etc. products and origins, agrarian and ecosystem services, etc.

Third, *private mechanisms and modes* ("private or collective order") – diverse private initiatives, and special contractual and organizational arrangements (long-term supply and marketing contracts, voluntary eco-actions, voluntary or obligatory codes of behavior, partnerships, cooperatives and associations, brads and trademarks, labels). For instance, conservation of natural resources is a part of the managerial strategy of many green (eco, green) farms.

Forth, *public mechanisms and modes* ("public order") – various forms of public (community, government, international) interventions in market and private sector such as public guidance, regulation, assistance, taxation, funding, provision, property right modernization, etc.

Fifth, *hybrid forms* – some combination of the above three modes like public-private partnership, public licensing and inspection of private organic farms, etc.

In a long run the specific system of governance of agrarian sector and sustainability (pre)determine the type and character of social and economic development (Bachev, 2010). Depending on the efficiency of system of governance of agrarian sustainability "put in place", individual farms, subsectors, regions and societies achieve quite dissimilar results in socio-economic development and environmental protection, and there are diverse levels and challenges in economic, social and ecological sustainability of farms, subsectors, regions and agriculture.

Agriculture consists of many agro-systems – from individual "farming plot", a "farm enterprise", an "agri-ecosystem", an "agro-region", up to a "national", "European" and "global". In this study we focus on the assessment of the (governance) sustainability of agriculture at national level as well and for the principle agricultural systems in the country – main type of farming organizations, major subsectors of agriculture, general kinds of agro-ecosystems, and all administrative (agro)regions (Figure 2).

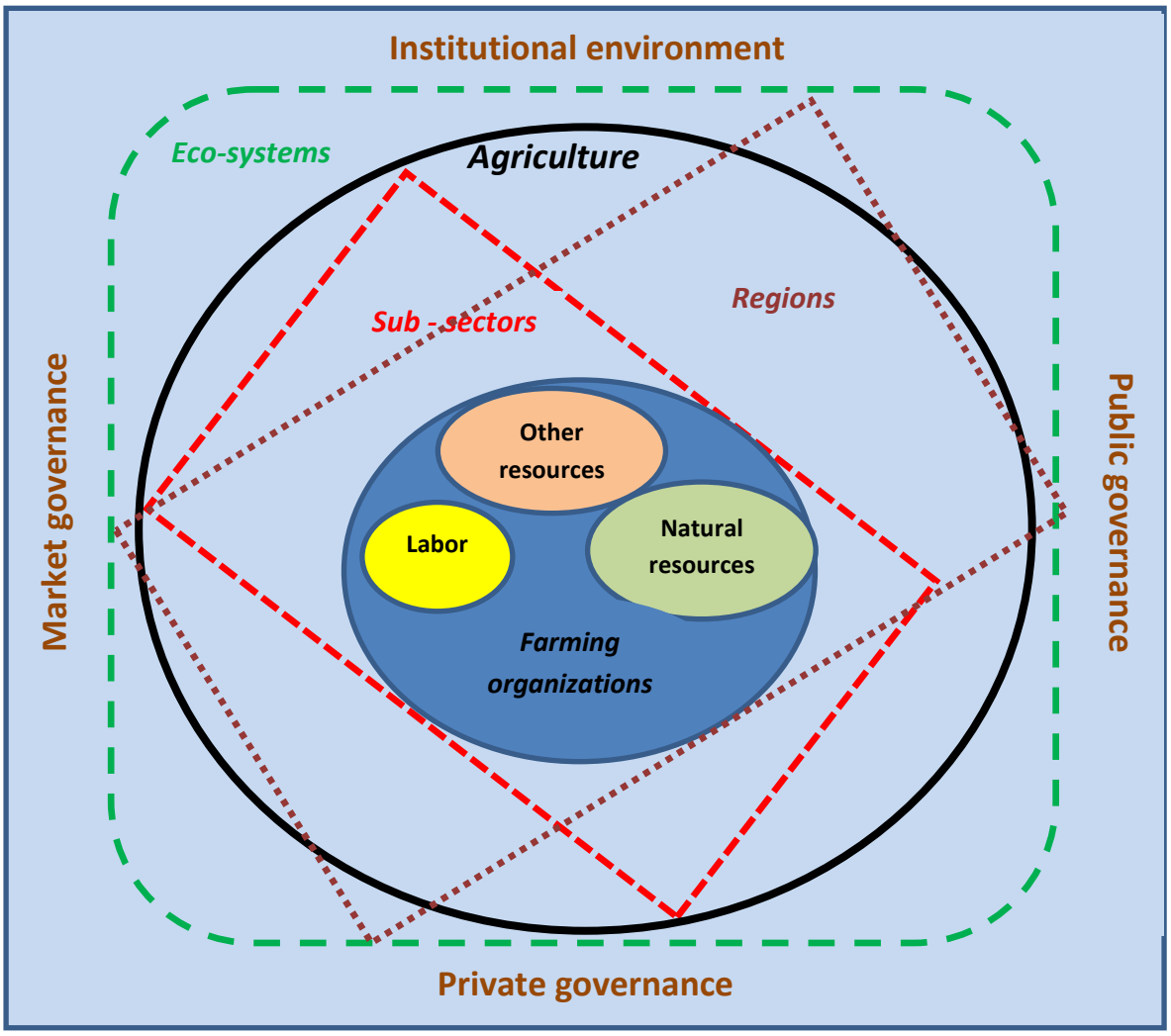
Many holistic sustainability assessment frameworks put a smaller ecosystem (e.g. "individual farming plot", "a pond", etc.) as the lowest (first) level of sustainability assessment in agriculture (Sauvenier et al., 2005). We have proved that *the farm* is the lowest level, where the management and organization of agricultural activity (and sustainability) is carried out, and where all aspects of the agrarian sustainability are "realized" and could be feasibly assessed (Bachev, 2005). That is why the farm (agro-system) rather than the smaller agro-systems within a farm boundary is to be the first level of agrarian (economic, governance, integral, etc.) sustainability assessment.

Furthermore, a special distinction is made between the governance sustainability of agriculture and the sustainability of management ("governance") structures in agriculture[2]. While sustainability of certain type of farms (e.g. "family holding") is included as major criteria for assessing the "social" (pillar) of agrarian sustainability, the specific level of sustainability of the individual governing structures (different type of farms, producers organizations, administrative bodies, etc.) is not a part of or related to the agrarian sustainability evaluation. It is well known that sustainable development is commonly associated with the adaptation of farms and other governance structures to constantly evolving socio-economic, market, institutional and natural environment which process is associated with diminishing importance ("sustainability") and/or liquidation of certain type of farms (public, cooperative, small-scale), restructuring and modernization of farming enterprises and agrarian administration, and emergence of diverse complex, vertically integrated and hybrid forms of governance, etc.

On the other hand, the Governance sustainability of agriculture expresses the ("working") state and contribution (toward sustainability goals) of the principle governing mechanisms and forms in the evaluated agro-system. Most of these mechanisms and modes of governance concern (affect) the specific governing structures used by individual agents (including farms, farming organizations, contractual and vertically integrated forms) and their sustainability but many are related to (farms' relations with and) other agrarian agents (resource owners, labor, inputs suppliers, processors, retailers, final consumers, agrarian administration, etc.), while other are associated with intra-entity/farm elements (e.g. enforcement of work, food safety, animal welfare, and environment standards, etc.).

[2] A comprehensive modern framework for assessing sustainability of farming enterprises is suggested by Bachev (Bachev, 2017, 2018).

Figure 2. Components and Levels of Assessment of Governance Sustainability in Agriculture



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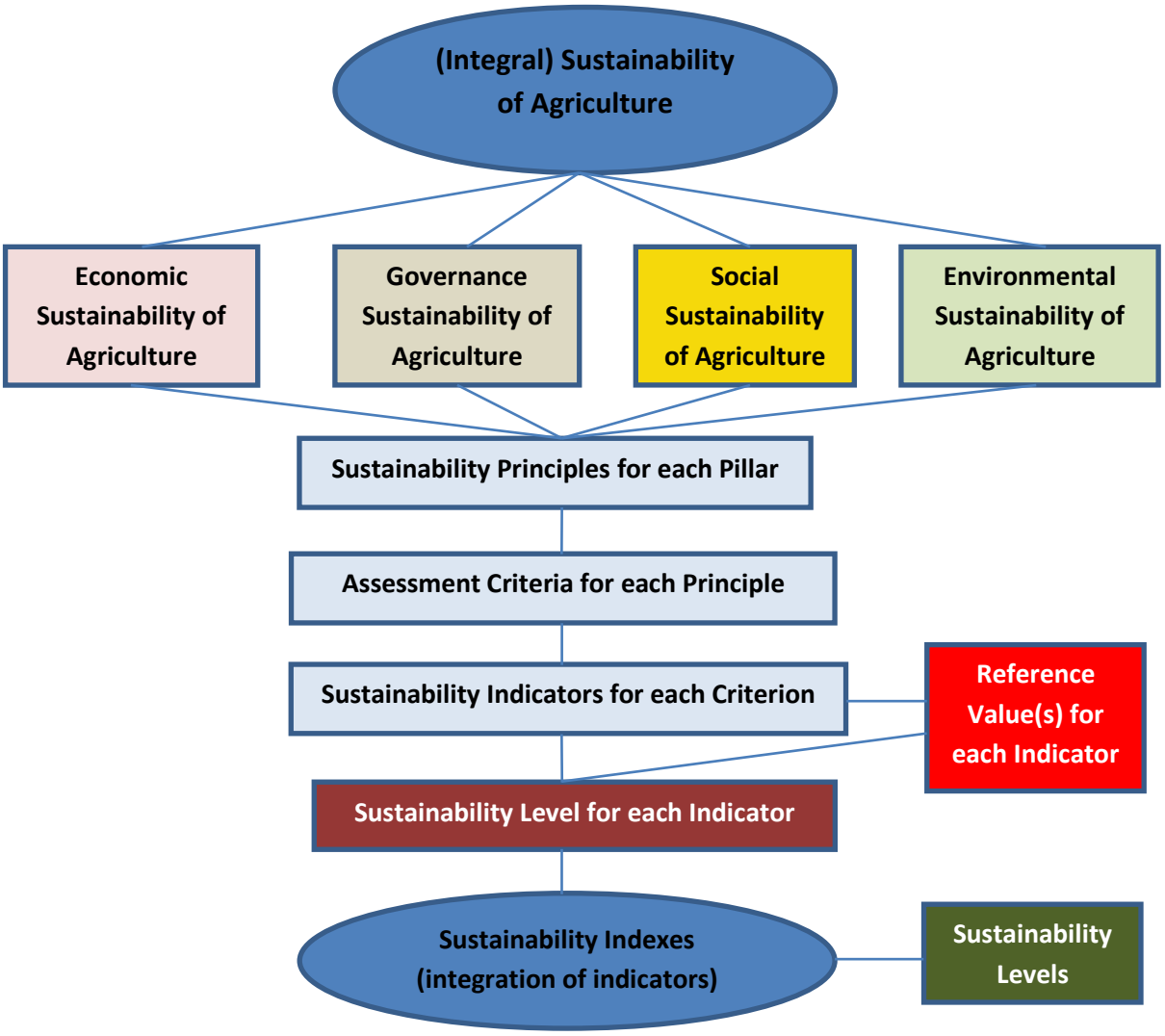
2. Incorporating the "New" Governance Pillar in the Assessment Framework of Agrarian Sustainability

In order to identify the individual indicators for assessing the (governance) sustainability of agriculture a hierarchical system of well-determined Principles, Criteria, Indicators, and Reference Values for each Aspect (Pillar) of sustainability is elaborated. Detailed justification of that *new* approach, and the ways and criteria for selection of sustainability Principles, Criteria, Indicators and Reference Values are presented in other publications by Bachev (2017, 2018), and Bachev et al. (2017, 2018).

The *Governance Sustainability Principles* are "universal" and relate to the multiple functions of the agriculture representing the states of the sustainability, which is to be achieved (Figure 3). For instance, for the "specific" contemporary conditions of Bulgarian (and European Union) agriculture following five (governance sustainability) principles related to the generic (five) mechanisms and modes of governance are identified: "Good legislative system", "Democratic management", "Working agrarian administration", "Working market environment", and "Good private practices" (Table 1).

Figure 3. Framework for Assessing Sustainability of Agriculture



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The *Governance Sustainability Criteria* are precise standards ("measurement approaches") for each of the Principle representing a resulting state of the evaluated system when the relevant sustainability Principle is realized. For instance, for the contemporary conditions of the Bulgarian agriculture 20 Criteria for assessing diverse aspects of the governance sustainability are specified. For example, for the Principle "Good legislative system" four Criteria are selected: "Harmonization with the European Union policies", "Extent of the European Union policies implementation", "Beneficiaries' satisfaction of the European Union policies", and "Policies effects" (Table 1).

The *Governance Sustainability Indicators* are quantitative and qualitative variables of different types which can be assessed in the specific conditions of the evaluated agri-system allowing measurement of compliance with a particular Criterion. The set of Indicators provides a representative picture for the agrarian sustainability in all its aspects. For the selection of the Sustainability Indicators a number of criteria, broadly applied in the sustainability assessment literature and practices, were used: "Relevance to reflecting aspects of sustainability", "Discriminatory power in time and space", "Analytical soundness", "Intelligibility and

synonymity", "Measurability", "Governance and policy relevance", and "Practical applicability" (Sauvenier et al., 2005).

For instance, for assessing the Governance sustainability of the Bulgarian agriculture at micro (farm) and macro (sectoral, regional, eco-system, etc.) levels a system of respectively 22 and 26 Indicators are specified. For example, for the Criteria "Policies effects" an Indicator "Level of subsidies comparing to the average for the sector" is selected for farm level, as well as two Indicators for the aggregate (sectoral) level – "Coefficient of subsidies distribution from Pillar 1" and "Coefficient of distribution of investment support comparing to share in Net Value Added" (Table 1).

Table 1. System of Principles, Criteria, Indicators, and Reference Values for Assessing Governance Sustainability of Bulgarian Agriculture

Principles	Criteria	Indicators		Reference values	
		Sectoral level	Farm level	Sectoral level	Farm level
Good legislative system	Harmonization with EU policies	Extent of policies harmonization	na	Experts estimate	
	Extent of EU policies implementation	Extent of financial implementation of policies	Extent of CAP implementation	Experts estimate	Beneficiaries estimates
		Extent of achievements of objectives indicators		Experts estimate	
	Beneficiaries' satisfaction of EU policies	Extent of beneficiary satisfaction of EU policies	Extent of beneficiary satisfaction of EU policies	Beneficiaries estimates	Beneficiaries estimates
	Policies effects	Coefficient of subsidies distribution from Pillar 1	Level of subsidies comparing to the average for the sector	High 0-0,25 Good 0,26-0,45 Satisfactory 0,46-0,6 Unsatisfactory 0,61-0,8 Unsustainable 0,81-1,0	Average for the sector
		Coefficient of distribution of investment support comparing to share in Net Value Added		High 0-0,25 Good 0,26-0,45 Satisfactory 0,46-0,6 Unsatisfactory 0,61-0,8 Unsustainable 0,81-1,0	
Democratic management	Representation	Share of producers represented in different public decision-making	Producers' representativeness in state and local	Experts estimate	Farm managers estimates

		bodies	authorities		
	Transparency	Transparency level	Level of access to information	Experts estimate	Farm managers estimates
	Impact	Share of overall support Net Value Added of agriculture	Share of subsidies in income	High 41-100% Good 26-40% Satisfactory 11-25% Unsatisfactory 6-10% Unsustainable bellow 5%	High 41-100% Good 26-40% Satisfactory 11-25% Unsatisfactory 6-10% Unsustainable bellow 5%
		Level of subsidizing in Net Income		High 41-100% Good 26-40% Satisfactory 11-25% Unsatisfactory 6-10% Unsustainable bellow 5%	
	Stakeholders' participation in decision-making process	К of real weight in the process	Farmers' participation in decision-making	Experts estimate	Farm managers estimates
Working agrarian administration	Minimum costs of using	Legitimate payments	Acceptability of legal payments	Beneficiaries estimates	Farm managers estimates
		Non-legitimate payments		Beneficiaries estimates	
	Access to administrative services	Share of digitalized services in overall number	Administrative services digitalization	Experts estimate	Farm managers estimates
			Agrarian administration efficiency		Farm managers estimates
	Information availability	Level of awareness	Extent of awareness	Beneficiaries estimates	Farm managers estimates
	Quality of services	Administration costs in Value Added of Agriculture	Administration service costs	High 0-0,01 Good 0,2-0,05 Satisfactory 0,05-0,1 Unsatisfactory 0,11-0,2 Unsustainable Bigger than 0,2	Farm managers estimates
Working market environment	Market access	Extent of market access	Market access difficulties	Experts estimate	Farm managers estimates

	Free competition	Extent of price influence	Prices negotiation possibilities	Experts estimate	Farm managers estimates
			Market competition		Farm managers estimates
	Competitive allocation of public resources	Extent of competitive distribution	Extent of competitive allocation of public resources	Experts estimate	Farm managers estimates
		Possibilities for taking part in public procurements		Experts estimate	Farm managers estimates
	Resource concentration	K of concentration of land resources	K of lands concentration	High bellow 200 xa Good 200-400 xa Satisfactory 400-600 xa Unsatisfactory 600-800 xa Unsustainable above 1000 xa	High bellow 200 xa Good 200-400 xa Satisfactory 400-600 xa Unsatisfactory 600-800 xa Unsustainable above 1000 xa
		Real possibilities of lands extension	Possibility for lands extension	Experts estimate	Farm managers estimates
Good private practices	Regulation implementation	Extent of regulations implementation	Extent of regulations implementation	Experts estimate	Farm managers estimates
	External control	Control regulation	Management Board external control	Experts estimate	Farm managers estimates
	Correctness of relationships	Extent of contract enforcement	Extent of contract enforcement	Experts estimate	Farm managers estimates
	Efficient informal system	Level of informal system efficiency	Level of informal system efficiency	Experts estimate	Farm managers estimates

Source: authors

3. Defining, Integration and Interpretation of Sustainability Level

For assessing the particular sustainability level a system of specific Reference Values (sustainability norms, range, and standards) for each Indicator is needed (Figure 3).

The *Governance Sustainability Reference Values* are the desirable levels for each Indicator according to the specific conditions of the evaluated agro-system. They assist the assessment of the sustainability levels giving guidance for achieving (maintaining, improving) particular aspect and the overall agrarian sustainability. Most of the Reference Values show the level(s), at which the long-term sustainability of agrarian Governance sustainability is "guaranteed" and improved. Depending on the extent of the Reference value achievement the evaluated agro-system may be with a "high", "good", or "low" sustainability, or to be "unsustainable". For instance, agrarian system with a higher than the sectoral public support (level of subsidies) is more sustainable then others as far as "Policy effects" are concerned, and vice versa.

Very often individual Indicators for each Criterion and/or different Criteria, and Principles of sustainability are with unequal, and frequently with controversial levels. That significantly hardens the overall assessment requiring a transformation into "unitless" Sustainability Index and integration of estimates (Figure 3). Diverse quantitative and qualitative levels for each indicator are transformed into a Index of sustainability (ISi) applying appropriate scale for each Indicator (Bachev et al., 2018).

The Integral Sustainability Index for a particular Criterion (SI(c)), Principle (SI(p)), and Aspect of sustainability (SI(a)), and the Integral Sustainability Index (SI(o)) for evaluated agro-system is calculated applying "equal weight" for each Indicator in a particular criterion, of each Criterion in a particular Principle, and each Principle in every Aspect of sustainability.

Using "equal" rather than differentiated weight is determined by the fact that individual Sustainability Aspects, and indeed Sustainability Principles, are "by definition" equally important for the Integral Agrarian Sustainability. At the same time, differentiation of the weights of individual Criteria within each Principle and the individual Indicators within each Criteria is difficult to justify as well as to a great extent unnecessary (practically unimportant for the Integral assessment) having in mind the big number and small relative contribution of each Indicator. Besides, we have found out that the calculations with and without differentiated weights do not led to any significant variations in the sustainability levels for the conditions of Bulgarian agriculture (Bachev et.al, 2019).

The Integral Index for a particular Criterion (SI(c)), Principle (SI(p)), and Aspect of sustainability (SI(a)), and the Integral Sustainability Index (SI(o)) are arithmetic averages of the Indices of composite Indicators, Criteria and Principles, calculated by the following formulas:

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

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

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

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

For assessing the level of Governance and Integral sustainability of agro-systems in Bulgaria the following scale, defined by the leading experts in the area (Bachev et al. 2018) are used:

Index range 0,81-1 for a "High" level of sustainability;

Index range 0.50-0,8 for a "Good" level of sustainability;

Index range 0,26-0,49 for a "Satisfactory" level of sustainability;

Index range 0,06-0,25 for an "Unsatisfactory" level of sustainability;

Index range 0-0,05 for "Non-sustainable" state.

The integration of Indicators does not diminish the analytical power of suggested assessment system, since it makes it possible to compare the (specific and integral) sustainability of diverse aspects of an agro-system and of agro-systems of different types, as well as identify "critical" factors for maintaining and improving sustainability, etc. Besides, since the assessment of sustainability levels for the individual Indicators is a (pre)condition for of the integration itself, the primary information always is available and could be analyzed in details if that is necessary. Depending on the objectives of final users and the analysis, the extent of integration of Indicators could be differentiated. While farm managers, investors, researchers etc. may prefer detailed information for each Indicator, for decision-making at a higher level (government, policy-makers, etc.) more aggregated assessment are needed (sufficient).

4. Assessment of Governance Sustainability of Bulgarian Agriculture

Elaborated novel holistic framework for assessing the Governance sustainability of Bulgarian agriculture is tested using experts and stakeholders assessments, and 2018 survey data[3] from the managers of 104 "typical farms" of different size and juridical type, production specialization, and ecological and geographical locations. The structure of surveyed farms approximately corresponds to the real structure of farms in different categories in Bulgaria. Classification of the surveyed farms into juridical type, size, production specialization, and ecological and geographical location is done according to the official definitions currently used in Bulgaria (and European Union).

In Bulgaria, like in many other countries, there are no official data for calculating most of the governance, socio-economic and environmental sustainability indicators at lower (farm, eco-system, subsector, regional, etc.) level (Bachev et. al., 2018). Therefore, micro and middle level assessment of socio-economic, environmental and governance sustainability is entirely based on the "original" first-hand information collected from the farm managers. The composite (Aspect and Integral) Sustainability Index of each evaluated agri-system (farming organization, agricultural subsector, agri-ecosystem, geographical region, etc.) is calculated as an arithmetic average of the Indices of relevant farms belonging to that system.

Assessment of the Governance sustainability at national (sectoral) level is evaluated in two ways – using experts and stakeholders (farmers, producers' organizations, etc.) estimates, and though aggregation of the information from the conducted farms survey.

The comprehensive assessment of the Governance sustainability of the Bulgarian agriculture by using aggregate (sectoral) and farming (survey) data shows quite unlike results – "Satisfactory" level in the former case, and (close to the border with "satisfactory" level but still) a "Good" level in the later case (Figures 4 and Figure 5).

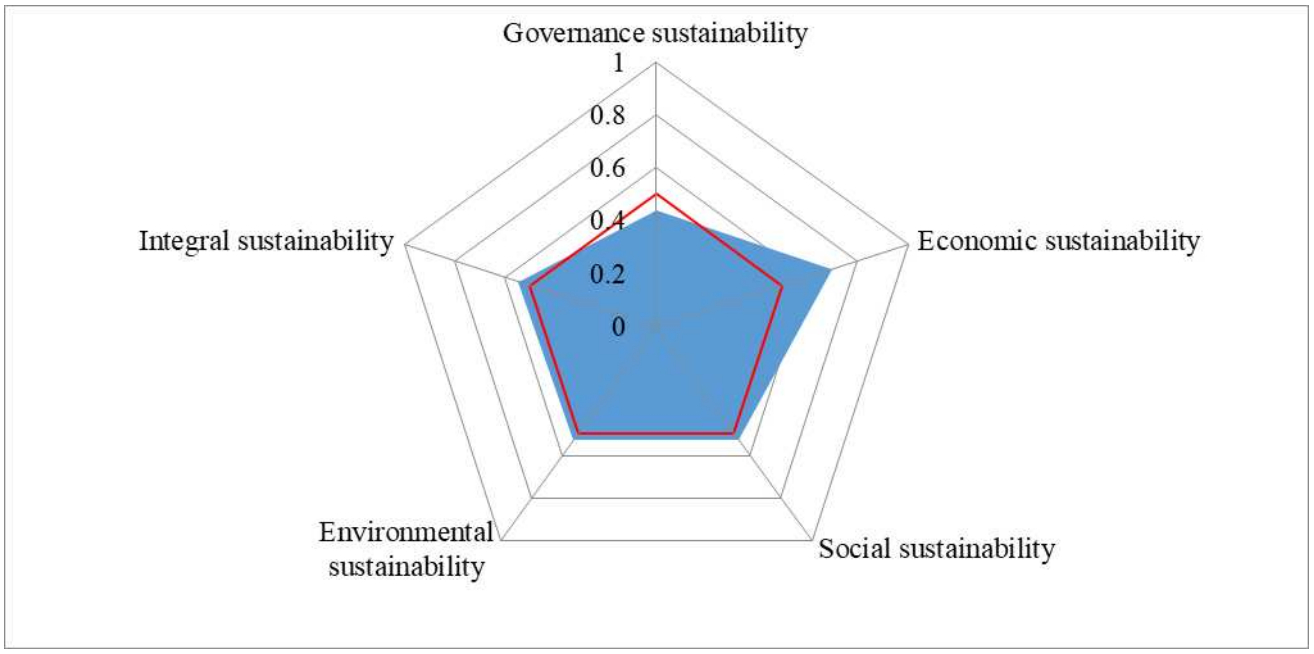
The Overall and Principles sustainability estimates based on the farm managers assessments are higher than those calculated on the base of the official (statistical, FADN, etc.) information, and experts and producers' organizations estimates (Figure 6). The discrepancies in the estimates for three Principles ("Democratic management", "Working market environment", and "Good legislative system") are crucial since they put the Governance sustainability in different (inferior) levels.

Therefore, Governance sustainability assessments always have to be based both on (complementary) macro and micro data in order to increase accuracy and extend reliability. Besides,

[3] The author expresses his gratitude to the National Agricultural Advisory Service for conducting the survey, and to participated farm managers for providing the valuable information.

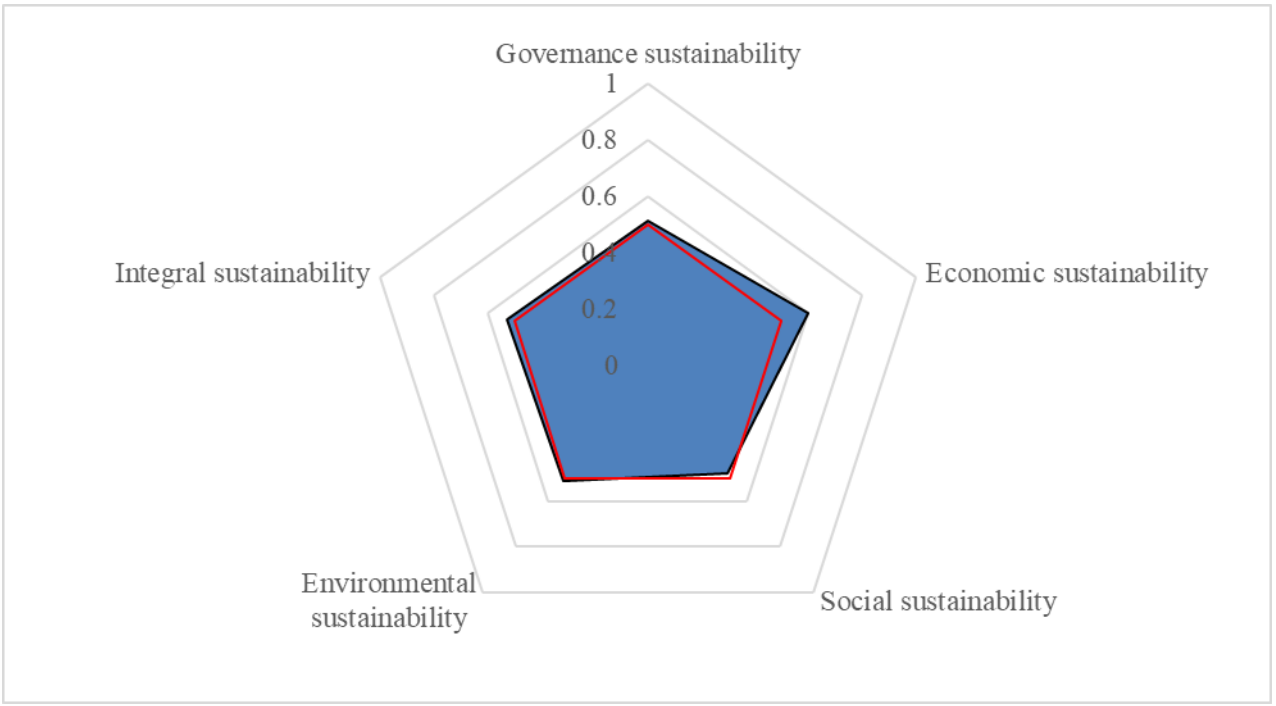
theoretical and practical work for the improvement of the assessment methods and data sources of the sectoral sustainability assessments (especially as far as the Governance Pillar is concerned) is to continue.

Figure 4. Levels of Governance, Economic, Social, Environmental and Integral Sustainability of Bulgarian Agriculture, calculation based on aggregate (sectoral) data



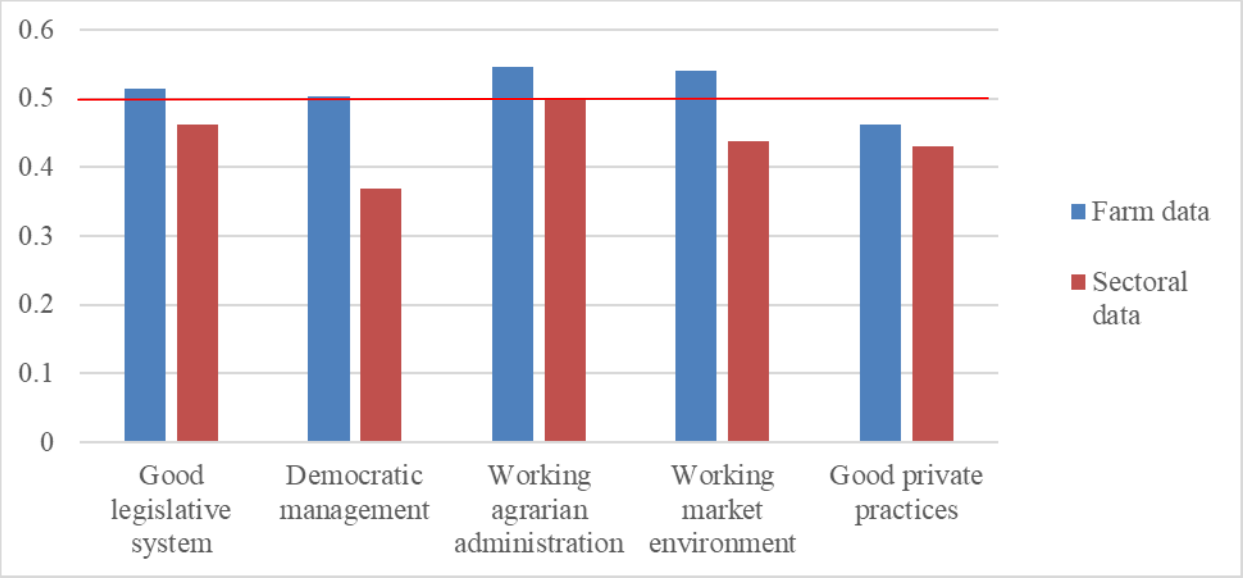
Source: Agro-statistics, experents' assessments

Figure 5. Levels of Governance, Economic, Social, Environmental and Integral Sustainability of Bulgarian Agriculture, calculation based on farm (survey) data



Source: survey with farm managers

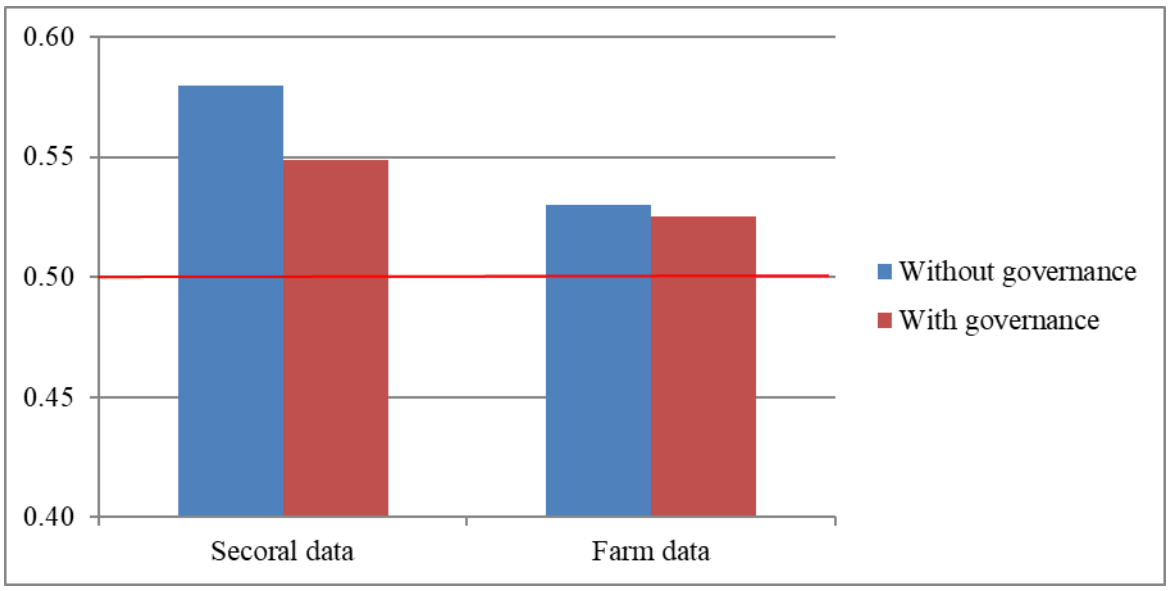
Figure 6. Sustainability Indexes for major Principles of Governance Sustainability, calculated on the base of sectoral and farm data



Source: authors

The inclusion of the "Governance Aspect" in the sustainability calculations changes the Integral Sustainability Index of Bulgarian agriculture using sectoral (with 0,03), and to a smaller extent farm (with 0,005) based estimates (Figure 7). However, taking into account the Governance aspect does not modify the overall ("Good") sustainability level using both type of information. The later is due to the fact that there are also differences in the Sustainability Indexes for the Economic, Social and Environmental aspects based on the aggregate (sectoral) and aggregated first hand farm data (Figure 3 and Figure 4), being particularly high for the Economic and Social sustainability (0,1 and 0,05 accordingly). The estimates based on the official aggregate sectoral data for the Economic, Social and Environmental aspects are higher than the corresponding levels based of micro farm data. Consequently, they do not affect the Integral sustainability "compensating" the contribution to the overall sustainability level of the Governance pillar.

Figure 7. Integral Sustainability of Bulgarian Agriculture "with" and "without" Including Governance Aspect



Source: Bachev et al, 2019; authors calculations

Nevertheless, the inclusion of the missing "new" and important Governance aspect is crucial since it ameliorates adequacy and precision of the sustainability assessment of Bulgarian agriculture. At the same time, all dynamics and discrepancies in the estimates between sustainability pillars and the estimates based of different (statistical, farm, etc.) type of data have to be taken into consideration in the analysis and the interpretation of results, while assessment indicators, methods and data sources further improved (Bachev et.al., 2019).

5. Unpacking the Governance Sustainability of Bulgarian Agriculture

Micro data collected from the farm managers are particularly important for the proper assessments and "unpacking" of different aspects of the Governance Sustainability of agriculture. Following is a detailed assessment of the Governance sustainability of Bulgarian agriculture based of the original farm survey data.

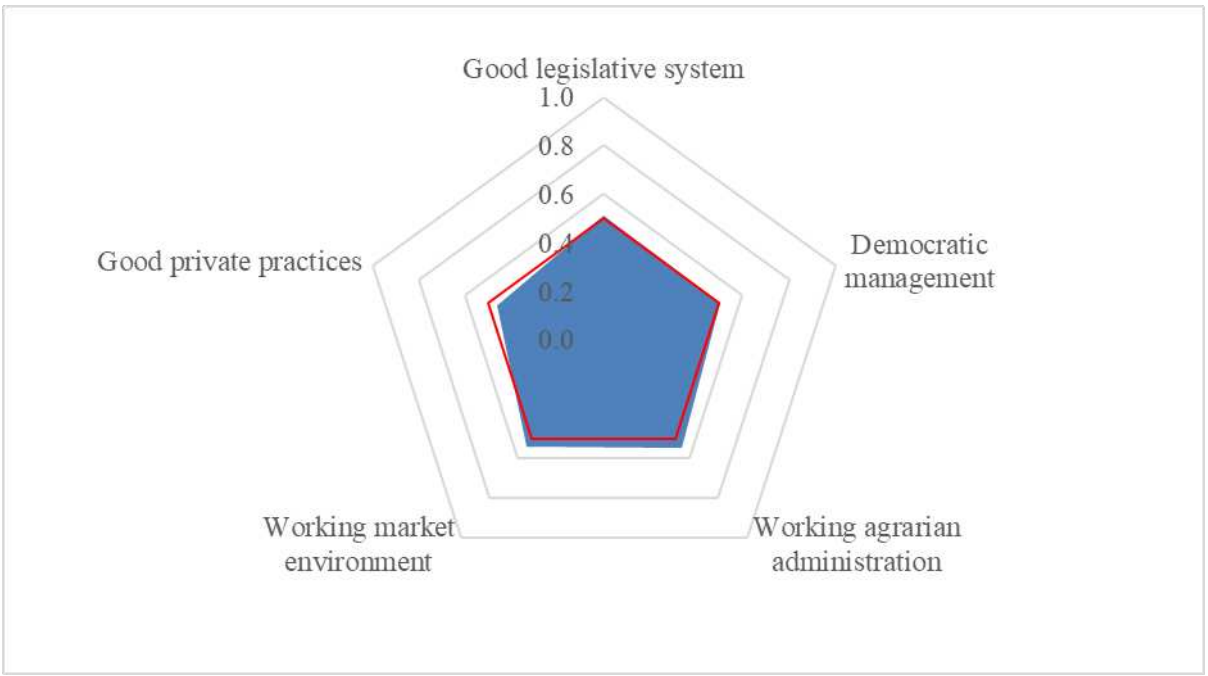
A multiple indicators assessment of the Governance sustainability level of Bulgarian agriculture indicates that the Index of Overall Sustainability is 0,51 - this represents a close to the lower ("Satisfactory") but still a "Good" level of Governance sustainability of the sector (Figure 5).

Analysis of individual Indexes for the primary sustainability Principles, Criteria, and Indicators allows identifying individual components contributing to the Governance sustainability of this important sector of Bulgarian economy.

For instance, the Governance sustainability of Bulgarian agriculture is relatively low because the Index for the Principle "Good Private Practices" is at "Satisfactory" level (0,46) and

compromises the Pillar's Integral sustainability. Moreover, Indices for "Good Legislative System" and "Democratic management" are quite low and at the border with the "Satisfactory" level - 0,5 and 0,51 accordingly (Figure 8). At the same time, Indices for the Principles "Working agrarian administration" (0,55) and "Working market environment" (0,54) are highest and contribute most for elevating (ensuring) the Governance Sustainability of the sector.

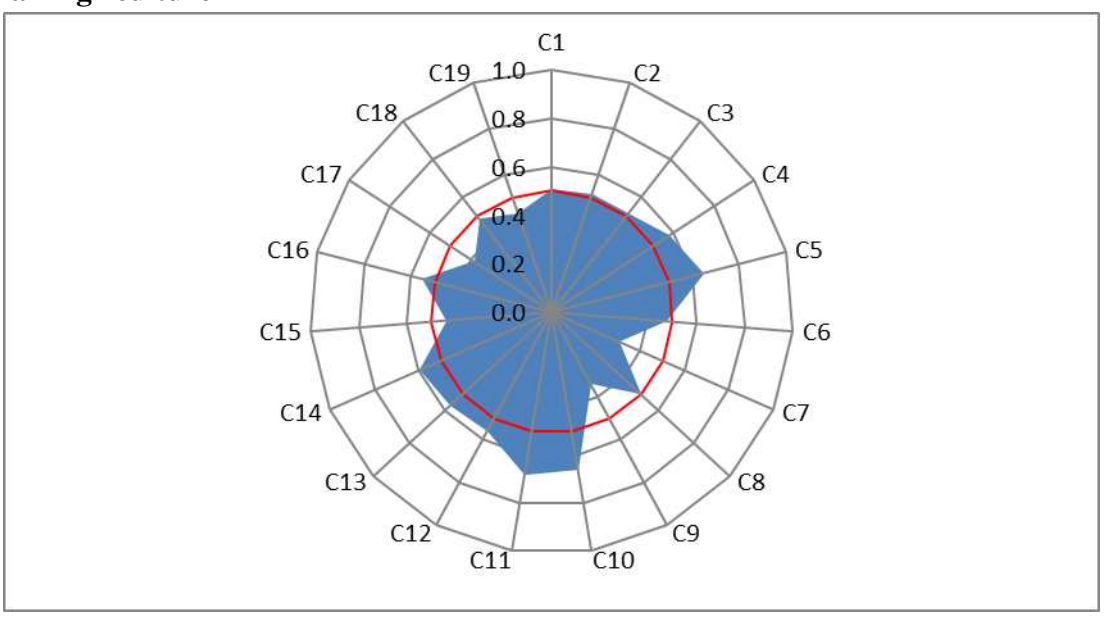
Figure 8. Indices of Sustainability for Major Principles of Governance Sustainability of Bulgarian Agriculture



Source: author's calculation

In depth analysis of the levels of the individual Criteria and Indicators further specifies the elements that enhance or reduce country's agricultural Governance sustainability. For instance, the insufficient "Good Private Practices" is determined by the low "External control" (over management) (0,38), weak "Contracts enforcement" (0,49) and inferior "Informal system efficiency" (0,43) (Figure 9). Similarly, despite that the Integral Index for "Democratic management" Principle is at a "Good" level, Indices for two criteria (policies) "Impact" and "Stakeholder participation in decision-making") are quite low at satisfactory territory. Likewise, "Working agrarian administration" seems "Good" but "Access to administrative services" is actually very low (0,34) at "Satisfactory" sustainability level. The same is true for the "Working market environment" which is "Good" while Index for the Criteria "Resource concentration" reviles low sustainability (0,43).

Figure 9. Indices of Sustainability for Major Criteria* of Governance Sustainability of Bulgarian Agriculture

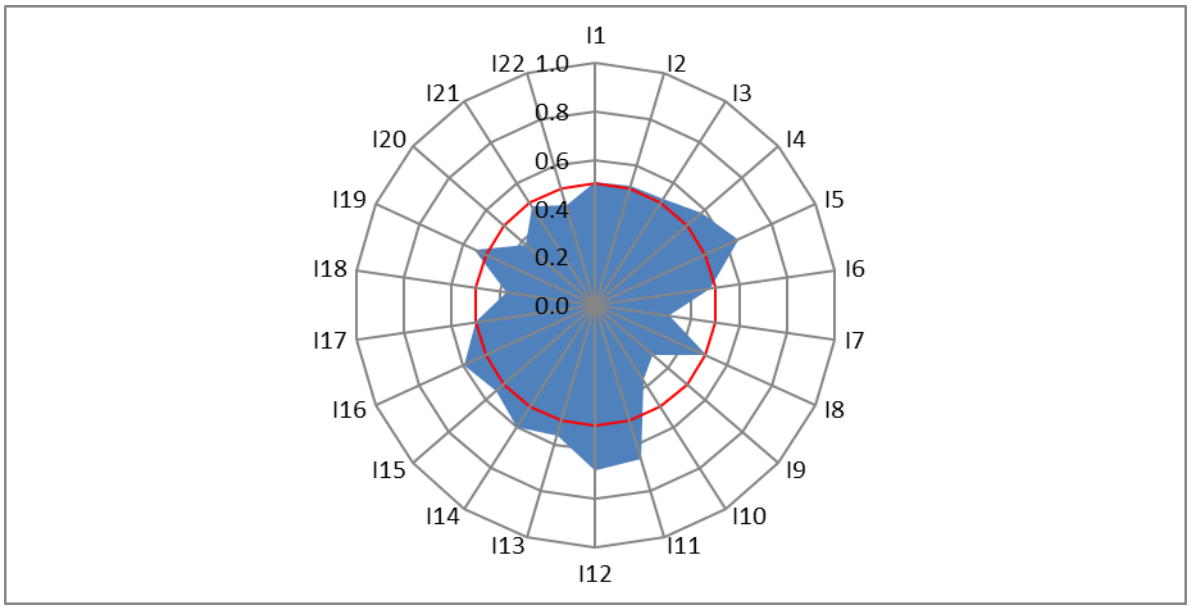


*C1-Extent of policies implementation; C2-Extent of beneficiary satisfaction of EU policies; C3-Policies effects; C4-Representation; C5-Transparency; C6-Impact; C7-Stakeholder participation in decision-making; C8-Minimum costs of using; C9-Access to administrative services; C10-Information availability; C11-Quality of services; C12-Market access; C13-Free competition; C14-Competitive allocation of public resources; C15-Resource concentration; C16-Regulation implementation; C17-External control; C18-Contracts enforcement; C19-Informal system efficiency

Source: author's calculation

Individual sustainability Indicators give precise information about the specific factors determining one or another values of a particular Criteria. For example, ineffective "Access to administrative services" is determined accordingly by the insufficient "Agrarian administration efficiency" (0,31) and undeveloped "Administrative services digitalization" (0,37) (Figure 10). Likewise "Satisfactory" sustainability for the "Resource concentration" is a consequence of the (low) "Possibility for lands extension" (0,37).

Figure 10. Indicators* for Assessing the Governance Sustainability of Bulgarian Agriculture



* I1-Extent of CAP implementation; I2-Extent of beneficiary satisfaction of EU policies; I3-Subsidies distribution; I4-Representativeness of state and local authorities; I5-Access to information; I6-Subsidies in Income; I7-Farmer's participation in decision-making; I8-Acceptability of legal payments; I9-Agrarian administration efficiency; I10-Administrative services digitalization; I11-Extent of awareness; I12-Administration service costs; I13-Market access difficulties; I14-Market competition; I15-Prices negotiation possibilities; I16-Extent of competitive allocation of public resources; I17-Lands concentration; I18-Possibility for lands extension; I19-Extent of regulations implementation; I20-Management Board external control; I21-Extent of contract enforcement; I22- Level of informal system efficiency.
Source: survey with farm managers

The low values for the Indicators help identify specific areas that require improvement through adequate changes in the institutional environment, public policy, modernization of agrarian administration, collective actions and/or management strategies. At the current stage of the development the most critical for increasing the Governance sustainability of country's agriculture are progressive improvements in following directions: "Farmer's participation in decision-making" (0,31), "Agrarian administration efficiency" (0,31), "Administrative services digitalization" (0,37), "Possibility for lands extension" (0,37), "Management Board external control" (0,38), "Level of informal system efficiency" (0,43), "Subsidies in Income" (0,48), "Extent of contract enforcement" (0,49), "Acceptability of legal payments" (0,5), and "Lands concentration" (0,5).

The higher levels of certain Indicators show the absolute and comparative advantages of the Bulgarian agriculture in terms of good governance and sustainable development. At the current stage of development, the most prominent of these include: "Representativeness of state and local authorities" (0,58), "Market competition" (0.6), "Extent of competitive allocation of public resources" (0.6), "Access to information" (0.65), "Extent of awareness" (0.66), and

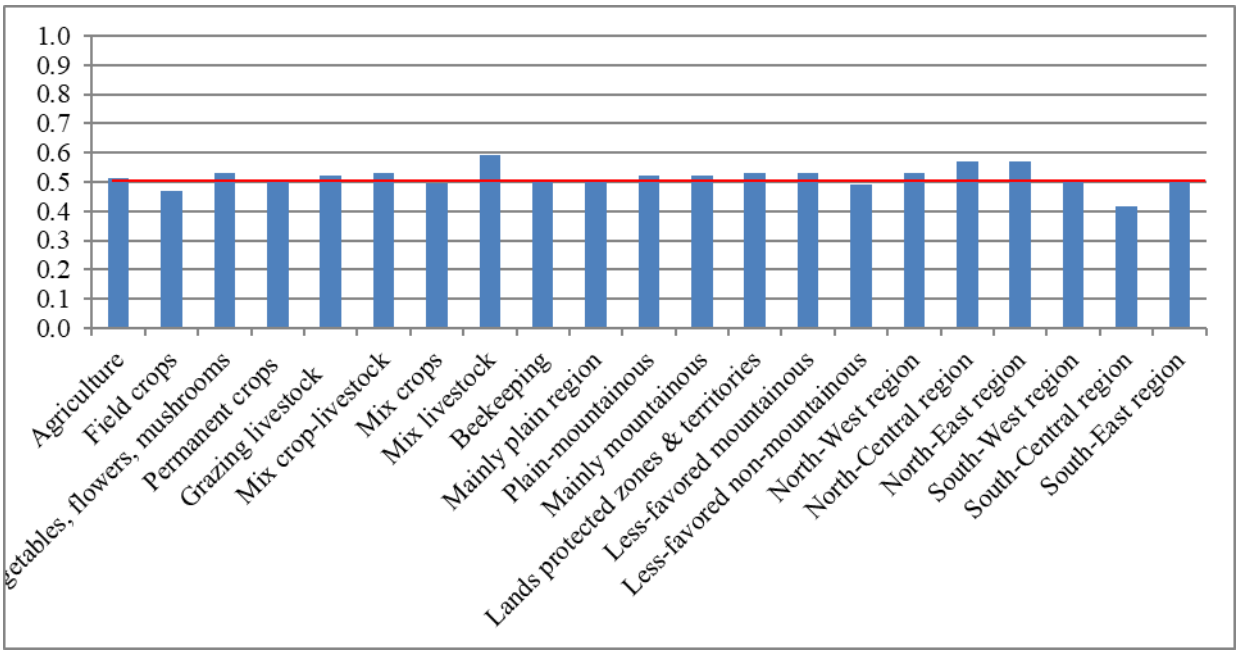
"Administration service costs" (0.68). Nevertheless, the top value(s) of the Governance sustainability Indicators in Bulgarian agriculture is relatively low. Therefore, there is a great potential for improvement of governance efficiency and further elevate the Governance and Overall sustainability.

5. Governance Sustainability in Major Agro-systems of the Country

The analysis of the Governance sustainability of different sub-sectors of Bulgarian agriculture shows that there is a great variation in the sustainability level. The highest ("Good") level of Governance sustainability is demonstrated in the "Mix livestock" production (0,59), followed by the "Vegetables, flowers, mushrooms" and "Mix crop-livestock" sectors (0,53) (Figure 11). Therefore, these three subsectors contribute to greatest extent for improving (maintaining) the overall Governance sustainability of Bulgarian agriculture.

On the other hand, the level of Governance sustainability in the "Grazing livestock" (0,52), "Permanent crops" (0,5), and "Beekeeping" (0,5) is close to the average in the sector. Finally, in some major subsectors like "Field crops" (0,47) and "Mix crops" (0,49), the level of the Governance sustainability is "Satisfactory" and far below the general one. This means that the later subsectors decrease in a biggest degree the Integral Governance sustainability of country's agriculture.

Figure 11. Governance Sustainability in Different Sub-sectors of Agriculture, Agri-ecosystems and Agrarian Regions of Bulgaria



Source: survey with farm managers

The different sub-sectors of Bulgarian agriculture are characterized by significant variation of the levels of Indices of the main Principles of the Governance sustainability. For instance, the Principle "Good legislative system" is the best realized in the "Vegetables, flowers, mushrooms" production (0,58) and "Mix-livestock" operations (0,57), and the worst in "Field crops" and

"Grazing livestock" sub-sectors (0,47). The Principle of "Democratic management" is the best applied in the "Mix livestock" production (0,62), while it is not "Satisfactory" in the "Beekeeping" (0,46), and "Mix crops" and "Mix crop-livestock" sub-sectors (0,49). The interior and superior levels of the Governance sustainability for particular Principles show the directions for improving the Governance sustainability in the relevant sub-sectors of agriculture.

The Principle "Working agrarian administration" is effectively applied in "Beekeeping" (0,57), and "Grazing livestock" and "Mix crop-livestock" (0,56), while agrarian administration does not "work" well in the sector of "Field crops" (0,44). The sustainability for the Principle "Working market environment" is the highest in "Mix livestock" (0,64), "Beekeeping" (0,63) and "Mix crop-livestock" (0,58). Simultaneously, market mechanisms are not working very well for the "Field crops" producers (0,5). Finally, "Good private practices" are the best implemented in the subsector of "Mix livestock" (0,62) and "Mix crop-livestock" (0,5), while in all other subsectors they are applied only "Satisfactorily", being particularly inferior in the "Beekeeping" (0,37) and "Field crops" (0,41).

In depth analysis of that type identifying inferior (critical) levels for sustainability Principles has also a high practical value since they show the specific directions (public, collective and private action areas) for improving the particular (Principle) and the Integral Governance sustainability in the evaluated subsector and agriculture in general. Further analysis of the sustainability level for the individual Indicators allows "complete" unpacking the "critical" factors enhancing and/or decreasing the Governance sustainability of each sub-sector.

The Governance sustainability of major agro-ecosystems in Bulgaria also demonstrates a great variation as the highest ("Good") ones are registered for the agro-ecosystems with "Lands in protected zones and territories" (0,53) and those in "Less-favored mountainous" regions (Figure 11). At the same time, the Governance sustainability of two agro-ecosystems - "Mainly plain" (0,5) and "Less-favored non-mountainous" (0,49) are below the national (sectoral) average, the second one being at inferior ("Satisfactory") level. Therefore, the later two type of agro-ecosystems decrease to the biggest extent the Integral Governance sustainability of Bulgarian agriculture.

The different agro-ecosystems of the country are further characterized by significant differentiations in the levels of Indices of main Principles of the Governance sustainability. The principle "Good legislative system" is the best implemented at "Good" level in the "Plain-mountainous" agro-ecosystems (0,56), while in the "Less-favored non-mountainous" (0,45) and "Mainly plain" regions it is at "Satisfactory" level (0,49). On the other hand, the principle of "Democratic management" is the best realized in "Less-favored non-mountainous" agro-ecosystems (0,56), in the most other type it is the same or close to the sectoral average (0,5), and in the "Mainly plain" regions it is at "Satisfactory" level (0,49). Furthermore, the principle "Working agrarian administration" is better applied in the agro-ecosystems in "Less-favored mountainous" regions (0,6), those with "Lands in protected zones and territories" (0,57), and in "Mainly mountainous" regions (0,55) while in all other types it is in below the national level. Similarly, the Principle "Working market environment" is with the highest value in the agro-ecosystems in "Mainly mountainous" regions (0,6), "Less-favored mountainous" regions (0,58), and "Less-favored non-mountainous" regions (0,57), while in other agro-ecosystems it is worse than national one. Finally, the Governance sustainability for the Principle "Good private practices" is best implemented in the "Lands protected zones and territories" (0,53), while in all other agro-ecosystems it is at "Satisfactory" level, being far worse than the sectoral average in the "Less-favored non-mountainous" regions (0, 36).

There is a significant variation in the different aspects of Governance efficiency among administrative (and agricultural) regions of the country. The Principle of the Governance sustainability "Good legislative system" dominates in the "North-West region" (0,6) and "North-Central region" (0,59), while in the "South-Central region" (0,38) and "South-West region" (0,49) it is only applied "Satisfactorily".

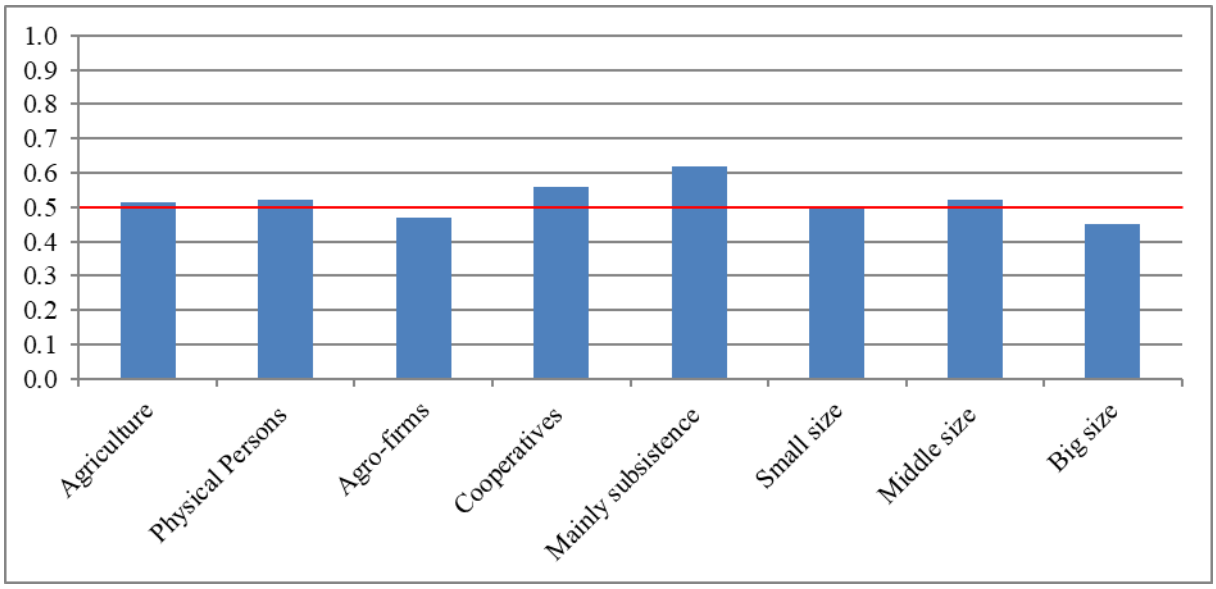
The Principle of "Democratic management" is the best realized in the "North-East region" (0,53) and "South-West region" (0,53), and insufficiently in the "South-Central region" (0,4) and "North-West region" (0,48). The Principle "Working agrarian administration" is effectively applied in the "North-East region" (0,57) and "North-East region" (0,61). Simultaneously, that Principle is "Satisfactory" applied in the "South-Central region" (0,49). Similarly, the Principle "Working market environment" are highly regarded in the "North-East region" (0,63) while in the "South-Central region" (0,45) and "South-East region" is inferior (0,47). Finally, the "Good private practices" are the best carried out in the "North-Central region" (0,58) and "North-East region" (0,59) while in the three south regions of the country they are enforced "Satisfactorily" (0,41, 0,36, 0,44 accordingly).

Last but not the least important, our approach let us assess what is the Governance sustainability for the various farming structures in the country, and how dominating institutional environment and modes of governance affect (contribution toward) sustainable development of major type of Bulgarian farms.

The system of governance of Bulgarian agriculture does not impact equally farms with different juridical type and size of operations. The Governance sustainability of agriculture is the highest for the "Semi-market" ("Mainly subsistence farms") and "cooperative" ("Cooperatives") sectors – the Integral Governance Sustainability Index for these type of farming organizations is much higher than the sectoral average - 0,62 and 0,56 accordingly (Figure 12). Other main juridical type of farms like "Physical Persons" and the "Middle size" farming enterprises also have higher than the average Governance Sustainability Index (0,52). Therefore, all these four types of farming organizations contribute to the greatest extent to increasing (maintaining) the "Good" Governance sustainability of Bulgarian agriculture.

At the same time, for the "Small size" farms the Governance sustainability is below the national one and at the border with the "Satisfactory" level (0,5). Furthermore, for the "Agro-firms" and "Big size" farming enterprises the Governance sustainability is at "Satisfactory" level - 0.47 and 0.45 accordingly. Consequently, these major type of farming enterprises diminish to the greatest extent the overall Governance sustainability of country's agriculture.

Figure 12. Governance Sustainability for Major Type of Farming Organizations in Bulgaria



Source: survey with farm managers

The main Principles of the Governance sustainability are applied ("work") differently in relations to various type of Bulgarian farms. The Governance Sustainability Principles "Good legislative system", "Democratic management" and "Good private practices" the most favorably affect the "Cooperatives" and "Mainly subsistence" farms (Indices of Sustainability accordingly 0,65 and 0,7; 0,55 and 0,67; 0,64 and 0,56). The Governance Sustainability Principle "Working agrarian administration" is the most effectively implemented in regards to "Mainly subsistence" holdings (0,66), "Physical Persons (0,55) and Middle size farms (0,55). The Governance Sustainability Principle "Working market environment" is more favorable for the "Middle size" (0,57) and "Small size" (0,56) farms.

On the other hand, the individual Principles for the Governance sustainability of agriculture are worse applied in and adversely impact different type of farms. The Sustainability for the "Good legislative system" Principle is at "Satisfactory" level for the "Agro-firms" (0,41) and "Small size" farms (0,48). The sustainability Principle "Democratic management" is at "Satisfactory" level only for the "Big size" farming enterprises (0,47). Implementation of the Principle "Working agrarian administration" is inferior ("Satisfactory") for the "Big size" farms (0,4) and "Cooperatives" (0,43); the sustainability Principle "Working market environment" does not work well for the "Big size" farms (0,38) and "Agro-firms" (0,48); and "Good private practices" are not applied sufficiently and badly affect "Agro-firms" (0,43), "Middle size" farms (0,45), "Physical Persons" (0,46), and "Small size" holdings (0,47).

Conclusions

This study has proved that it is important to include the "missing" Governance Pillar in the assessment of the Integral sustainability of agriculture and sustainability of agro-systems of various type. Furthermore, it has demonstrated that (and how) the Governance sustainability level can be quantitatively "measured" and "integrated" in the system of overall sustainability assessment. Finally, the elaborated holistic framework has been successfully tested in Bulgarian conditions and showed promising results for proper understanding and fully "unpacking" the Governance sustainability of country's agriculture.

This first in kind comprehensive assessment of the Governance sustainability of Bulgarian agriculture let make some important specific conclusions about the state of (Governance) sustainability of diverse agro-systems, and recommendations for improvement of the managerial and assessment practices. The elaborated and experimented holistic approach gives a possibility to improve the overall and Governance sustainability assessment. Therefore, it has to be further discussed, experimented, improved and adapted to the specific conditions of evaluated agricultural systems and needs of decision-makers at different levels.

Multiple Principles, Criteria and Indicators assessment of the Governance sustainability of Bulgarian agriculture indicates that the Overall Sustainability is at a "Good" but very close to the "Satisfactory" level. Besides, there is a considerable differentiation in the level of Integral Governance sustainability of different agro-systems in the country – agricultural sub-sectors, agro-ecosystems, agro-regions, and type of farming organizations. Last but not least important, results on the integral agrarian sustainability assessment of this study based on micro (farm) and macro (statistical, etc.) data show some discrepancies which have to be taken into consideration in the analysis and interpretation, while assessment indicators, methods and data sources further improved.

This study reviled that much of the needed information for calculating the Governance sustainability is not readily available and have to be collected though experts' assessments, farm managers and professional associations surveys, etc. Nevertheless, a big challenge is the (level of) competency and willingness for "honest" estimated of the interviewed agents. For instance, for some highly "sensitive" questions in the conducted ("anonymous") survey many of the farm managers did not respond due to lack of opinion, experience, capability and/or reluctance for assessment, etc.

Having in mind the importance of holistic assessments of this kind for improving the agrarian sustainability in general, and the Governance sustainability of agriculture in particular, they are to be expended and their precision and representation increased. The later requires improvement of the precision through enlargement of surveyed farms and stakeholders, and incorporating more "objective" data from surveys, statistics, expertise of professionals in the area, etc.

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