Governance in Agricultural Markets, Organizations and Development

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"En İyi Akademi, Bir Kitaplıktır."

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ISBN •978-625-365-401-6

1. Baskı • Ekim, Ankara 2023

Dizgi/Mizanpaj • Gazi Kitabevi
Kapak Tasarımı • Gazi Kitabevi

Gazi Kitabevi Tic. Ltd. Şti.
Yayıncı Serti ika No: 44884

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PREFACE

The challenge of comprehending and assessing governance systems, particularly in the context of agrarian governance, remains a prominent issue in both academic and practical spheres. Nevertheless, there exists a significant divergence in how governance is understood among scholars, practitioners, and official documents. It can be associated with high-level management, governmental agencies, or even transcend government entities. Sometimes, it is used interchangeably with the term "Management," while in other cases, it encompasses various modes.

In this book endeavors to employ an interdisciplinary approach drawing from the New Institutional Economics to establish a comprehensive framework for analyzing the agrarian governance system in Bulgaria. Drawing on prior research and practical insights, it underscores the complexity of agrarian governance, encompassing four principal components: the agrarian and associated agents making management decisions, the rules and mechanisms governing their behavior, the processes related to governing decisions, and the resulting social order within the system.

Analyzing agrarian governance necessitates examining individual system elements, various governance levels, and the primary functional areas of agrarian governance. Quantitative and qualitative institutional approaches are recommended for each area of analysis. When evaluating agrarian governance, it is vital to consider the personal attributes of participating agents, the institutional environment, transaction costs and benefits, the efficiency of alternative governance structures, and the temporal dimension.

A preliminary assessment reveals that the governance of Bulgarian agriculture, within the context of the EU, stands at a moderate level. It excels in equity, solidarity, and the functionality of the public sector. Conversely, it lags behind in terms of the private sector's functionality and stakeholder involvement. Further research in this nascent field is imperative to refine economic analysis approaches and better understand this multifaceted category.

Incorporating the framework of New Institutional and Transaction Costs Economics, in this book presents a practical method for evaluating the gover-

nance efficiency of Bulgarian farms, both as a whole and in terms of different legal forms and operational scales. Governance efficiency is appraised using micro-data collected from typical farms' managers. The "Nature of the problems in effective organization for major class farm transactions for securing needed factors of production and marketing of output" serves as an indicator, revealing that a substantial proportion of farms in the country operate with low efficiency and are at risk of discontinuation. Major factors contributing to inferior governance efficiency include deficiencies in labor supply, innovation, know-how, and funding. Governance efficiency levels vary significantly among farms of different legal forms and sizes, demonstrating a strong correlation between governance efficiency, adaptability, and a range of internal and external factors that could enhance holdings' competitiveness.

The assessment of farming enterprises' competitiveness has long been a focal point for various stakeholders. Traditionally, competitiveness has been evaluated based on technical and financial indicators, often overlooking governance aspects. In this book introduces a comprehensive multi-pillar framework to assess the competitiveness of Bulgarian farms of diverse legal types, sizes, product specializations, and ecological/geographical locations. It defines four pillars (economic efficiency, financial resources, adaptability, and sustainability), each with specific criteria and indicators. The study concludes that while the overall competitiveness of agricultural holdings in Bulgaria is at a good level, there is considerable differentiation among farms with respect to legal structure, size, specialization, and location. Weak adaptability and economic efficiency are key factors limiting competitiveness, and without intervention and support, a significant portion of Bulgarian farms may face discontinuation.

Furthermore, the study explores the utilization of wastewater treatment plant sludge in agriculture, recognizing the pivotal role played by the institutional structure in shaping related activities. Over the past two decades, Bulgaria has made significant progress in the agricultural use of sludge, driven by improvements in the institutional framework. However, regional disparities persist, necessitating further interdisciplinary research to identify limiting factors. This research should involve collecting micro and macro data, devising a new national strategy, and studying trends in other EU countries to enhance the sector's development.

Lastly, in this book addresses the governance of agro-ecosystem services,

highlighting the lack of studies in Bulgaria on this crucial subject. It introduces a holistic definition of governance and proposes a framework for identifying, measuring, and assessing governance mechanisms and modes. The book identifies various ecosystem services provided by Bulgarian farms and the multiple governance modes applied. It demonstrates that managing agro-ecosystem services entails increased production and transaction costs but offers socio-economic and environmental benefits. Factors stimulating producers' efforts in protecting agro-ecosystem services include participation in public support programs, access to advice and training, information availability, subsidies, personal conviction, and integration with agricultural stakeholders.

In summary, these book collectively shed light on the complexity of governance in various aspects of Bulgarian agriculture, emphasizing the need for further research and policy interventions to enhance the sector's efficiency, competitiveness, and sustainability.

This book has been funded by the Bulgarian Science Fund, the project "The Mechanisms and the Modes of Agrarian Governance in Bulgaria", Contract № КП-06-Н56/5 from 11.11.2021.

Bachev, Ivanov, Kargı, Uçkaç
April, 2023
Sofia, Istanbul

Introduction

The problem of adequate understanding and evaluation of system of governance, and agrarian governance in particular, is among the most topical academic and practical (policies and business and farms strategies forwarded) tasks. However, there is huge differences in understandings of the governance among scholars, practitioners, and official and business documents. Sometimes it is associated with the top management of a country, a company or organization; sometimes it is related to government agencies (public administration); sometimes it encompasses the management outside and beyond government entities; sometimes it is used as synonym of Management, in other instances it is part of the Management of an organization, while in some case it is more general than Management including a great variety of modes, etc.

The goal of the book is to adapt the interdisciplinary methodology of the New Institutional Economics and to propose an adequate definition and framework for analyzing the system of agrarian governance in Bulgaria. Based on a critical review of previous research and practical experience in this area, it is underlined that agrarian governance is to be studied as a complex system, including four principle components: agrarian and related agents involved in making management decisions; rules, forms and mechanisms that govern the behavior, activities and relationships of agrarian agents; processes and activities related to making governing decisions; a specific social order resulting from the governing process and functioning of the system.

The analysis of agrarian governance should include the individual elements for the system, different levels of governance, and the main functional areas of agrarian governance, for each of which adequate quantitative or qualitative methods of institutional approach are suggested. When evaluating the agrarian governance system, the personal characteristics of the participating agents,

the institutional environment, transaction costs and benefits, the comparative efficiency of alternative governing structures, and the "time factor" must be taken into account.

The initial holistic assessment found out that the Governance of Bulgarian agriculture is at moderate level having in mind the EU perspective. The highest performance is attained under the principles of Equity and Solidarity and the Good Working Public Sector while in terms of the Working Private Sector and the Stakeholders Involvements it is the lowest. Further theoretical and empirical research in this "new" field is needed to better understand this complex category and refine approaches to its economic analysis.

Second section incorporates the New Institutional and Transaction Costs Economics framework and suggests a practical approach for assessing the level and factors of governance efficiency of Bulgarian farms as a whole and of different juridical types and operational sizes. The evaluation of governance efficiency of the country's farms is made on the basis of original micro-data collected by the managers of typical farms. The "Nature of the problems in effective organization for major class farm transactions for securing needed factors of production and marketing of output" is used as an indicator for the comparative efficiency and adaptability (equal, lower, or greater to another farm/s or organisation/s depending on the extent of transacting difficulties) of individual farms. The study has found that the governance efficiency of farms is at a Good level but 60% of all farms in the county are with a Low efficiency and will likely cease to exist in near future. Major factors for inferior governance efficiency of Bulgarian farms are unsatisfactory efficiency in Supply of Necessary Labour, Innovations and Know-how, and Funding. There is a huge variation in the level and factors of governance efficiency of farms with different juridical types and sizes as well as in the share of farms with different levels of efficiency in each particular group. Furthermore, a strong correlation has been found between the level of governance efficiency and adaptability of farms, and diverse critical internal and external market, technological, institutional, personal, etc. factors that could feasibly increase the competitiveness of holdings. The study has proved that there is a big discrepancy between the new assessments of Governance efficiency with dominating traditional approaches for farm efficiency assessments based on factors' productivity. The study has also found that there was an improvement in the overall governance efficiency of Bulgarian farms compared to 2016. Nevertheless, the share of (good and

high) efficient farms significantly declined during the same period. The suggested approach has to be further improved, and widely and periodically applied in economic analysis at various levels which require the systemic collection of a novel type of micro-data on farms governance and transaction costs.

The issues related to proper assessments of the competitiveness of farming enterprises in general and of different type and locations has been among the most topical for academicians, agro-business managers, interests-groups, administrators, politicians, international organizations, and public at large. Farm competitiveness has been usually assessed through traditional indicators of technical and accountancy efficiency, the productivity of factors of production, the profitability of activity, the farms' market position and shares, etc. A systematic approach for defining competitiveness and formulating its pillars, principles, criteria, and indicators has been rarely implemented, end the critical governance aspects have been largely ignored.

This book incorporates a holistic multipillars framework, and assesses the levels of and correlations between the competitiveness of Bulgarian farms of different juridical types, economic sizes, product specialization, and ecological and geographical locations. For assessing the level of competitiveness of farms, a system of 4 pillars (Economic efficiency, Financial endowment, Adaptability and Sustainability), 4 criteria for each Pillar, and 17 particular and 5 integral indicators are used.

The book has found out that the level of competitiveness of agricultural holdings in the country is at a good level, but there is significant differentiation in the level and factors of competitiveness of holdings with different juridical types, sizes, product specialization, ecological and geographical location. The low adaptive potential and economic efficiency to the greatest extent contribute to lowering the competitiveness of Bulgarian agricultural producers. A large share of farming enterprises has a low level of competitiveness, and if measures are not taken in a due time to improve governance and public support, a large part of Bulgarian farms will cease to exist in the near future.

The suggested approach for assessing the competitiveness of farms should be improved and applied more widely and periodically. The precision and representativeness of the information used should also be increased by increasing the number of farms surveyed, which requires close cooperation with other interested parties, and improving the system for collecting agro-statistical information in the country and the EU.

The issue of understanding, analyzing and assessing the governance of ecosystem services in general, agro-ecosystem services in particular, is among the most topical academic and practical (policies and business forwarded) task. Despite of the growing importance and interests in that new area, in Bulgaria, like in many other countries, there are few studies on the meaning, content, measurement and assessment of the specific governance of agro-ecosystem services. This book tries to give answer to following academic and practical (policies and business forwarded) questions: what is governance of agro-ecosystem services, which are components of the governance system of that important area, how to assess the governance of ecosystem services, and how to improve the governance. It incorporates the interdisciplinary New Institutional Economics framework and gives new insights on understanding, scope, and assessment of the system of governance of ecosystem services as well as outline the result of a large scale study on mechanisms, modes and impacts of governance in Bulgarian farms. First, it suggests a holistic definition of the governance encompassing (1) the governing agents, and (2) the available rules, mechanisms and modes for agents, and (3) the process of governing, and (4) the outcome (specific order and efficiency) of governance. Secondly, we presents a framework for identification, measurement and assessment of the mechanisms and modes of governance, and associated factors, costs and benefits for related agents. Third, it identifies the type, amount, and importance of various ecosystem services maintained and "produced" by the Bulgarian farms. Forth, it identifies and assess the mechanisms, modes, efficiency and factors of governance of ecosystem services in Bulgarian agriculture. The study has found out that a muluple private, market, and public forms and mechanisms are used to govern agro-ecosystem services in Bulgaria. The country's farms provide a great number of essential ecosystem services among which provisioning food and feed, and conservation of elements of the natural environment prevail. A great variety of private, market, collective, public and hybrid modes of governance of farm activity related to agro-ecosystem services are applied. There is significant differentiation of employed managerial forms depending on the type of ecosystem services and the specialization of holdings. Furthermore, management of agro-ecosystem services is associated with a considerable increase in production and transaction costs of participating farms as well as big socio-economic and environmental effects for farms and other parties. The factors that mostly stimulate the activity of agricultural producers for protection of (agro)ecosystems services are participation

in public support programs, access to farmers' advice, professional training, available information, and innovation, received direct subsidies from EU and national government, personal conviction and satisfaction, positive experience of others, long-term and immediate benefits for the farm, and integration with suppliers, buyers, and processors.

The process of turning wastewater treatment plants sludge from "waste into good (product)" is conditioned by various social, economic, technological, agronomic, personal, etc. factors, an important place among them is occupied by the institutional structure in which the related agents carry out their activities and relationships. Institutional Environment and Institutions of Governance provide opportunities and set constraints for agents in the chain, structure and determine their behavior and activity, and ultimately (pre)determine the effectiveness and the degree of use of sludge in agriculture. In this study, the interdisciplinary methodology of the New Institutional Economics is adapted and an analysis and assessment of the institutional structure of WTP sludge utilization in Bulgarian agriculture is made.

The book found that over the last two decades, the institutional structure (regulatory framework, public, private, market and hybrid forms) of sludge utilization in Bulgarian agriculture has significantly improved. As a result, great progress has been observed in the agricultural use of sludge in the country. At the same time, uneven and unsustainable development of this process was found in the different regions of the country. Therefore, all factors limiting the behavior of the associated agents and leading to these fluctuations in sludge utilization are to be identified. In view of their relevance, interdisciplinary studies and evaluations of the institutional structure and factors of sludge utilization in agriculture have to be expanded and enriched. However, for this, it is necessary to collect a new type of micro and macro information from all interested parties, including through the official system of agro-statistics in the country and the EU. In view of the leading role of public intervention in this area, a new national strategy for the utilization of WTP sludge is to be developed, reflecting modern conditions and social priorities, and special measures be taken to support the interested parties, including farmers with tools of CAP. Trends in the development of the institutional structure and the utilization of sludge in other EU countries have to be also studied in order to assess where Bulgaria is and where efforts are to be focused in the future.

Section 1

What is Agrarian Governance and How to Evaluate it

1. Introduction

The term Agrarian Governance is widely used in official documents, management practice, and in numerous academic publications around the globe and Bulgaria (Ali, 2015; Backer, 2011; Bachev, 2010, 2014; Bayyurt *et al.,* 2015; Bevir, 2012; Bloor, 2022; Boevski, 2020; Braun & Birner, 2017; Carbone, 2017; Chakrabarti, 2021; Chhotray & Stoker, 2009; Darjaven Vestnik, 2021; Dimitrov *et al.,* 2014; Dixit, 2016; DFID, 2010; EC, 2019, 2021; Frija *et al.,* 2021; Freidberg, 2019; Fukuyama, 2016; Ganev *et al.,* 2020; Georgiev, 2013; German, 2018; Higgins & Lawrence, 2005; Herrfahrdth, 2006; Katsamunska, 2016 ; Kumar & Sharma, 2020; Ledger, 2016; Levi-Four, 2012; Muluneh, 2021; Morfi, 2020; OECD, 2015, 2019; Planas et al, 2022; Schwindenhammer, 2018; Rodorff *et al.,* 2019; Shand, 2018; Terziev *et al.,* 2018; Tleubayev *et al.,* 2021; Torres-Salcido & Sanz-Cañada, 2018; Vymětal, 2007; UN, 2015; Weiss, 2000; World Bank, 2022). The significant academic, public and private interest in the study of the governnace system is dictated by the fact that the effectiveness of the specific governance system ultimately (pre)determines the degree of achievement of the diverse goals and the type of socio-economic development of a given country, industry, region, community, ecosystem, economic organization, etc. (Ostrom & Schlüter, 2007; Ostrom, 1999; North, 1990; Williamson, 1998, 2005). The relevance of the problem is also strengthened by the numerous examples of "failure" of the existing governance system on a sectoral, national, and international scale, the major socio-economic and ecological challenges and "crises" of various types, and the strong social "pressure" towards and drive by government, professional and business organizations to "reform" and "modernize" the existing governing system.

However, the experience of Bulgaria and many other countries shows that this academic and social problem is far from being solved. One of the main reasons for this is that an adequate holistic approach to understanding, analyzing and evaluating the governance system in general and in the agrarian sphere in particular is not yet applied. The aim of the section is to adapt the interdisciplinary methodology of the New Institutional Economics (Coase, 1991, 1998; Furubotn & Richter, 2005; Ostrom, 1990, 1998; Williamson, 1998, 2005; North, 1990) and to propose an adequate definition and approach to analyze of the system of agrarian governance in Bulgaria.

In the Bulgarian language, there are no suitable words to distinguish the categories Governance from Management, and one word (управление) is used for both of them. This often causes confusion, even among experts in the field. To avoid misunderstandings (increasingly often) the "Bulgarianized" English term Governance is used in academic, managerial and everyday practice.

2. Content and Evolution of the Understanding of Agrarian Governance

The content of the Governance category is constantly expanding and enriching, which is determined both by the development of theory and the evolution of the forms used in practice, and the needs for evaluation and improvement. In view of its significance, Governance represents a growing interest for independent study by scholars in multiple disciplines - political scientists, legal scholars, sociologists, historians, economists, etc. In parallel, many new (specialized) areas of scientific research and governance practices are being identified and developed depending on the subject, functional area, level or type of management: program governance, contract governance, supply chain governance, environmental governance, agricultural sustainability governance, water, land and landscape governance, e-commerce governance, global governance, etc. Individual researchers and disciplines typically apply their own definitions of this key concept. Recent decades have seen borrowing and mutual enrichment, and interdisciplinarity of approaches to understanding and analyzing Governance from scientific disciplines and social practices.

The term Governance is derived from the Greek word kubernaein ("to steer") and is believed to be used as far back as Plato (Malapi-Nelson, 2017). The term was later adopted from Latin, then from Old French, and from there

into Medieval English, from where it gained worldwide distribution (Vymětal, 2007). In more recent history, this term was used in the sense of "the specific activity of governing the country" (Tyndale & Frith, 1831), and as distinguished from individual governance and in relation to institutional structure, originally used by Charles Plummer in The Governance of England (Wikipedia, 2023). After the modernization of the late 18th century, when the state became decisive for solving complex socio-economic problems, the term Governance acquired "political significance" (Vymětal, 2007). It becomes an expression of government and state policy, reflecting its form and/or the effectiveness of the intervention measures taken. This approach to understanding the category associates it solely associated with power and force, and with the government's activity of direct care, command and control "from above" through public bureaucracy.

As a result of the complexity of socio-economic processes and challenges, the development of globalization, economic integration and democratization, and the numerous "failures of the state" and the fundamental reformation of the public sector, a new understanding of governance has been developing. In this connection, the term New Governance arose, which refers to the changes in the state that began in the 1980s (Britanica, 2023; Higgins & Lawrence, 2005 Planas *et al.,* 2022; Trubek & Trubek, 2007). This "broader" understanding is related to the transformation of "services" from public administration to market, private, non-governmental and network structures, increasing the role of outside and above state organizations and civil society, and (the need for) cooperation and interaction of numerous public and private institutions and organizations.

It is generally accepted that Governance is a general, complex, multifaceted concept that is difficult to define in a precise way (Ali 2015; Fukuyama, 2016; Higgins & Lawrence, 2005; Scmitter, 2018; Vymětal, 2007). Attempts to define Governance can be grouped into several directions:

First, the traditional understanding of governance as agents (individuals, agencies, organizations, etc.) who govern and/or participate in governance – President, Parliament, etc. (Fukuyama, 2016). In a narrower understanding, Governance is seen as a synonym for public administration, and in a broader sense it includes non-sovereign and informal agents outside the state system - international and non-governmental organizations, supra-national institutions such as the European Union, etc. For example, in the popular New Gover-

nance paradigm, the question of "Governance without Government" is posed, which means the transfer of many traditional functions from the state to private and non-governmental organizations - provision of public goods, services, regulations, control, (self) organization, etc. In this connection, the various agents are also identified, defined as governing units that can govern - government, formal organization, socio-political, or other informal group of people. In traditional economics, for example, the main governing units that optimize the allocation of resources in accordance with their interests are households and firms.

Second, defining Governance as a process of governING. A large number of authors accept that governance is the decision-making process and the process by which decisions are implemented (or not implemented) in society or in an organization (Ali, 2015; IoG, 2003; Planas *et al.,* 2022; UNDP, 1997; Wolman *et al.,* 2008). This "processual" understanding of Governance makes a connection with traditional Management, which is essentially a purposeful process of making managerial decisions at different levels of governance. A large number of international organizations also define governance in this way, mostly in relation to a given country, a certain industry, etc. – "governance consists of traditions and institutions through which power in a given country is exercised" (World Bank, 1992, 2022).

Similarly, economic governance is defined as the processes that support economic activity and economic transactions by protecting property rights, sanctioning contracts, and taking collective action to provide appropriate physical and organizational infrastructure (Dixit, 2016). In the traditional economy, the market equilibrium is reached namely through a process of decentralized actions of the economic agents (individuals, firms, households) governed by the "invisible hand of the market". In the New Institutional Economics, in addition to the "public" level Public Ordering) and market management (Market ordering), an important component of the governing process is also private ordering (Williamson, 2005).

Third, defining Governance as a means (precondition) and a set of rules, means, methods, structures and mechanisms that govern people's behavior, activity and relationships (Furubotn & Richter, 2005; Scmitter, 2018; Vymětal, 2007; Williamson, 1996; 2005). "Governance has become a buzzword today describing the whole set of approaches and techniques for improving coordination between different levels of society" (Vymětal, 2007). Similarly, econo-

mic governance refers to the policies and regulations that are put in place by governments to manage the economy, including macroeconomic management and microeconomic management (AAID, 2008). Economics is a science that explains the "miracle" of how an order of maximization of private and aggregate product (welfare) is achieved by the actions of millions of individuals who specialize and exchange the products of one or other operations. The answers in Neoclassical Economics are that this is done (directed, coordinated, incentivized, sanctioned) by the "invisible hand of the market" and/or the "visible hand of the manager". Rare cases of "market failure" are found, but all of them are easily overcome with "state intervention".

The Old Institutionalism puts on the agenda the important role of institutions (introduced "from above" or evolved "from below") to "correct" market failures and govern the behavior of individuals. The classics of the New Institutional Economics also consider Governance in this sense: "Governance is the means by which to introduce order, thus mitigating conflicts and realizing mutual benefits" (Williamson, 2005, 2009). What is new here is that the "strange world" without transaction costs is left, and the market, hybrids, firms, and bureaus are considered as alternative structures and forms of governance of transactions (Coase, 1939, 1991, 1998; Williamson, 1996, 1999, 2005, 2009). Although they do not always mention this term, Coase, North, and Ostrom also analyze certain rules, mechanisms, and forms (institutions, structures, social arrangements, etc.) that govern the activities of individual agents and ultimately predetermine economic development (Coase, 1937, 1960, 1991; North, 1990, 1991; Ostrom, 1990, 1999).

Fourth, Governance is seen as a specific social order and the result of process of managment - "the state of being governed" and "getting work done by mobilizing collective resources" (Dixitr 2016; Fukuyama, 2016; Scmitter, 2018; Vymětal, 2007). Here it is presented rather as a general order and framework that determines the conditions, harmony and overall effect of decentralized efforts - the management of the activities and relations of agents pursuing their interests. Accordingly, in a given country, regions, industry, etc. different types or models of governance may dominate - "Rule of Law", "Rule of Money", "Rule of Force", etc.

This understanding makes it possible to better distinguish specific governance systems in different countries, industries, eco-systems, organizations, stages of development, etc. The same governance structures and models are

known to have unequal results in different countries. Some researchers limit governance only to the social and political order other than that of the state in view of the "new" role of the market, network structures, non-state agents and the informal sector (BRITANICA, 2023). The New Institutional Economics analyzes a different kind of principled order – market, private, public, international, etc.

This understanding is largely related to the study of the "quality of management" and the effort to improve the governance system, as "desired" states such as "good", "efficient", "honest", "sustainable", "transparent", "democratic" etc. becomes a criterion for its evaluation and a goal of development (EC, 2018; UN, 2015). Much of the Good Governance literature focuses on 'Governance as Implementation', namely the government's capacity to provide basic public goods and services (Fukuyama, 2016; Osabohien *et al.,* 2020; Ronaghi *et al.,* 2020). Increasingly, these characteristics are also applied to assess governance in the private (corporate, agribusiness, etc.) and non-governmental sectors (Dimitrov *et al.,* 2014; Aguilera & Cuervo-Cazurra, 2009; Benz & Frey, 2005; OECD, 2015 ; Rodorff *et al.,* 2019; Sacconi, 2012; Skerman, 2016).

In that "normative" direction, the definitions of international, state, non-governmental and business organizations are also supplemented - for example, the current definition of governance of the World Bank also includes "the process by which governments are elected, controlled and replaced; the government's capacity to effectively formulate and implement rational policies; and respect for citizens and the state of the institutions that govern their economic and social relationships (World Bank, 2022). Governance Economics is precisely an attempt to apply "the study of good order and working arrangements", which includes both - the spontaneous order of the market and the deliberate order of a conscious, deliberate and purposeful kind (Williamson, 2005).

There are also many definitions that combine some of the characteristics of governance described above (EC 2018; WB, 2023). It is rightly noted that "Governance is not only a characteristic, but very often a system, with some subjects, some processes, some prerequisites, causality and results" (Vymětal, 2007).

Approaches to defining Agrarian Governance, in the ever-growing literature in this field, are similar to those of Governance in general, following the

common logic of development in this dynamic field. Some of the most in-depth analyzes of the agrarian governance system do not even attempt to define this category, which is taken for granted and widely known (James, Klein, & Sykuta, 2011; Sykuta, 2010; Cook, 1995; Sykuta & Cook, 2001; Sykuta & Parcell, 2003).

Agrarian Governance is the governance related to agricultural production. Therefore, it is "easy" to define the object of this "sectoral", along with industry, transport, health care, etc., governance. It order to understand the essence of the Governance category, it is necessary to answer the following questions: Who, Whom, What, Why, How, Where, When and for How Much?

It is obvious that Governance is related to people and human society, for without them there is only "natural governance" according to the laws of physics, biology, etc. In a hypothetical example of an individual farmer living alone on a remote island in the ocean, there is no governance, but simply "agronomic and technological" management or Management of "(mutual) relations" with nature. In modern agriculture, however, there are no such examples. Even for a self-subsistent farmer, far from populated areas (a mountain, an island, a desert oasis), there is some "external" control of activity and behavior[1]. For example, there are "vested" and sanctioned property rights (for private possession, usage, management, etc.) over agricultural land by the state, local government or community.

In modern conditions, there are also a variety of mandatory state, European Union, local community, etc. regulations on the manner of cultivation and use of the land, standards for the protection of biodiversity and the environment, etc. For example, the use of certain chemicals in agricultural production and the production of cannabis in Bulgaria are prohibited and punishable; changing the use of agricultural land for non-agricultural purposes is inadmissible and strictly regulated, etc. In addition, there are also informal obligations and restrictions for the farmer to respect comfort of the population and guests of the area, protection of air and water, joint use of private resources (for example, free access to the territory for tourists, hunters, scientists, etc.), order for

1 The activity and behavior of even the solitary Robinson Crusoe is "governed" by the native (English) ideology, beliefs, traditions and other "institutions" that he brought to the island and subsequently spread - Christianity, slavery, rights, etc.

use of municipal lands, etc. With all these formal and informal rules and restrictions (social governance system) the farmer (must) comply in order not to be sanctioned by law enforcement or society.

The farmer, however, is not a passive "participant" in (object of) governance. He lobbies or engages in collective action with other agents in the political process to get new rights, regulations, norms, government support and subsidies, etc. that suit his beliefs or interests. In this way, he becomes an active participant in the governance system of a given ecosystem, region, subsector, or the country as a whole. This simple example already answers the questions Who and Whom?

In another example, with a typical market-oriented farmer in a lowland area, the presence and need for (a system of) governing relationships with other agents is much more obvious. For example, the farmer-entrepreneur must manage his relationships with landowners, labor, suppliers of inputs and services, credit, buyers of produce, etc. in order to effectively organize the production and sale of produce. For the coordination of a large part of these relations, various types of private contracts are used for supplying the necessary resources and marketing the product - contracts for purchase, hiring, borrowing, selling, provision of a loan, etc. In the conditions of developed markets, much of the farmer's activity and his relations with other agents is coordinated and "managed by the invisible hand of the market" - the "movement" of (free) market prices and market competition.

Along with this, there are also a variety of formal, informal and business rules, regulations, norms, and standards that the farmer observes or complies with - for product and service quality, specifics of technological operations, labor and product safety rules, norms for the protection of natural environment and biodiversity, animal welfare standards, etc. In addition, the farmer creates and/or joins different types of collective actions and organizations to coordinate and govern more effectively his relationships with other agents or authorities - registered agricultural holdings, companies, cooperatives, associations, lobbying and interests groups. He also has his own or accepts other beliefs, ideologies, views, norms, etc. – for example, for an ecologically sustainable farm, which also (self-)manage its behaviour, actions and relationships.

All these (management) structures, forms and mechanisms are an integral part of the governance system of agrarian production at the modern stage of development and should be analyzed. Moreover, the governance system in a given country, sub-sector, region, supply chain, ecosystem or organization is highly specific and dependent on multiple socio-economic, personal, natural, etc. factors. It is well known that the Common (agricultural, economic, environmental, etc.) policies of the European Union are applied in specific "Bulgarian way" in the conditions of Bulgaria. Identifying and evaluating these specific structures, forms, and mechanisms answers the What, Why, and How?

The process of agrarian governance takes place in different time periods and spatial-territorial, organizational and hierarchical boundaries. Governance analysis should always specify these dimensions and answer the Where and When questions to be precise. In addition, the Economists ask another question related to the analysis of agrarian governance, namely How much? Different forms and structures of governance have different advantages, disadvantages and costs for individual agents, the latter known as "transaction costs" (Coase, 1937, 1960; Williamson, 1996). Agrarian agents optimize not only production costs (related to production technology), but also transaction costs related to governing relationships with other agents. Governing structures have an important economic role - to rationalize, structure, and minimize the costs of human relations (North, 1990; Williamson, 2000). The "discovery" of transaction costs does not change, but only adds to the Economic science subject of optimal allocation of limited resources.

Therefore, agrarian governance is to be studied as a complex system that includes four principle components (Figure 1.1): (1) agrarian and related agents involved in the governance decision-making; (2) rules, forms, and mechanisms that govern the behavior, activities, and relationships of agrarian agents; (3) processes and activities related to making managerial decisions; and (4) a specific social order resulting from the governing process and functioning of the system.

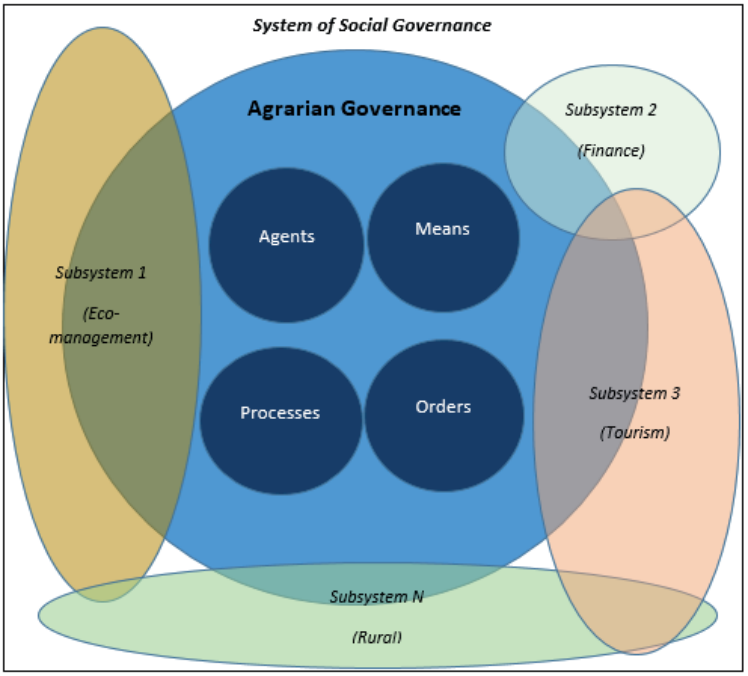

Figure 1.1. *System of Agrarian Governance*

Source: Authors.

The agrarian governance system is a part (subsystem) of the social governance system and other important governance subsystems such as economy, primary industry, food, rural or urban areas, agro-ecosystem, tourism, energy, etc. The impact of and relationships with other systems of society largely (pre) determine the type of dominant system of agrarian governance and the "logic" of its development. For its part, agrarian governance is a set of different governance subsystems, differentiated depending on the type of production (plant breeding, animal breeding, fruit growing, agro-ecosystem services, etc.), the type of resources (land, water, technology, lab The agrarian management system is a part (subsystem) of the social management system and other important management subsystems such as economy, primary industry, food, rural or urban areas, agro-ecosystem, tourism, energy, etc. The impact of and relationships with other systems of society largely (pre)determine the type of dominant system of agrarian governance and the "logic" of its development. For its part, agrarian management is a set of different management subsystems,

differentiated depending on the type of production (plant breeding, animal breeding, fruit growing, agro-ecosystem services, etc.), the type of resources (land, water, technology, labor, finance, etc.), the functional area (inputs supply, innovation, marketing, risk management) etc. All of them should are to be studied in order to identify their specificity and role for the development of agrarian governance in general. Agrarian governance consists of (carried out at) different levels (farm, collective organization, ecosystem, subsector, national, transnational, European, global), which are to be analyzed in order to understand the functioning and development of agrarian governance in Bulgaria.

3. Framework for analyzing and assessing agrarian governance in Bulgaria

In a traditional closed subsistence economy, transaction costs do not exist because there is (almost) no division and specialization of labor, and therefore no need for exchange (transactions) between agents. In modern agriculture, however, agrarian agents specialize in certain productions and/or activities and trade products or services, thereby increasing productivity many times over (economies of scale and scope, and production costs, improving quality, increasing production volume, etc.).

In an unrealistic world of "zero transaction costs", the optimization of the allocation and use of agrarian resources is achieved quickly and costlessly according to the "marginal rule". Here, there is only one mechanism (the market and market competition) that effectively governs the individual and overall activities of agents. The farm, firm and household are studied as a "black box" that adapts instantly and costlessly to market price dynamics. With zero transaction costs, the form of governance has no economic significance, since agricultural activity is equally well (most efficiently) coordinated through the market (adaptation to changes in free market prices), and through mutual private bargaining between agents (special contract), and through cooperation (collective decision-making), and in an internal organization (direction by a manager), and in a single national private or state hierarchy/company (Bachev, 2012).

In a real agrarian economy, however, there are significant costs associated with transactions between agents: for finding the best prices and markets, paying commissions and fees, finding a reliable partner, negotiating terms of

exchange, writing and registering contracts, controlling of opportunism before signing and in the process of implementing agreements, adapting contracts to changes in production and exchange conditions, dispute resolutions, including by hiring lawyers, arbitration, court, etc., failed deals, fraud, etc. Agrarian agents also pay significant (transactional) costs for studying and implementing formal regulations related to resource use, production, technology, trade, nature conservation, etc. Farmers also have significant costs for formal registrations, certifications, licenses, applying for public support, paying fines, bribes, etc. Many agrarian agents also have coalition costs (partnership, cooperative, firm, corporation) related to the need for more efficient joint supply and use of resources, marketing, protection from monopoly, lobbying for government intervention in their favor, etc. The creation and development of these formal and informal organizations is associated with significant costs of initiation, negotiation, formation, organizational enhancement, information, management decision-making, controlling the opportunism of coalition members, reorganization and closure, etc.

The positive transaction costs often limit efficient farm expansion to a sizes that allow exploitation of possible technological economies of scale and scope. In other cases, high "external" transaction costs necessitate excessive intra-firm integration to overcome serious transactional difficulties and/or extract additional transactional benefits. Very often, high transaction costs even block an otherwise mutually beneficial exchange of resources, products and services, and lead to low productivity and under-utilization of resources on an enterprise and societal scale. Therefore, instead of "the first best", in practice we usually have "second best", "third best", etc. allocation of resources and governance of aggregate agrarian activity.

Agrarian economy is a Transaction costs economy and the question is to optimize the total production AND transaction costs of the farm. This is a trade-off between transactional and production costs and benefits. Following the logic of Coase, the farm integrates additional transactions, increases its size and profits from internal integration of resources and activity, while the transaction costs of this are less than or equal to the costs of organizing these same transactions in the market or by another organization (Bachev, 2012). Governance "matters" and "rational" agents select the most efficient form of governance for each transaction among practically possible alternatives (Williamson, 2005). In the New Institutional Economy, the transaction and related

costs are the "basic unit of economic analysis", and the criterion for choosing the most effective form of governance of agrarian transactions and activity is the minimization of transaction costs and the maximization of transaction benefits[2].

Moreover, the "problem of social costs" that has troubled traditional economists does not exist in a setting of zero transaction costs and well-defined private property rights (Coase, 1960). The state of maximum efficiency is always achieved regardless of the initial distribution of rights between individuals through cost-free private negotiations - "internalization of externalities" without the need for state intervention. In a world of zero transaction costs, the definition (redistribution) of new rights and rules by individuals, interest groups, and society, and the effective sanctioning of these rights and rules, would be also easy (costless). However, when transaction costs are significant, the initial distribution of property rights among individuals and groups, and their well-defined and sanctioned nature, are critical to overall efficiency (Coase, 1960). For example, if the "right to a clean and preserved natural environment" is not well defined and enforced, it creates great difficulties for effective eco-management - costly disputes between polluters and affected agents; significant environmental issues and challenges; disregarding the interests of certain groups or generations, etc. (Bachev, 2020).

Imperfect institutional arrangement (undefined and/or poorly defined and enforced by the state authority rights and obligations), creates additional transaction costs for individuals and society, and leads to inefficient agrarian development. In Bulgaria, for example, the restoration of private rights to agricultural land after 1989 lasted more than 10 years, which greatly deformed the development of agriculture during this period - lack of incentives, destruction of assets, dominance of short-term leases, preference for annual crops, primitive and unsustainable structures (farms for self-sufficiency or in the process of privatization), degradation of agro-ecosystems, etc. There are numerous examples of private rights not protected by the state even now, which lower the efficiency and hinder the development of the sector - non-compliance with the laws, ineffective legal protection, direct encroachment (theft) of agrarian property, etc.

2 Eventually, the choice of governance form is predetermined by the logic of minimizing not technological but transactional costs (Williamson, 2005).

Therefore, institutions are an important means of (agrarian) governance by creating a certain social order, structuring human relationships, increasing predictability, reducing uncertainty, predetermining (increasing or decreasing) the amount of transaction costs, and ultimately determining the possibilities, type and extent of socio-economic development (North, 1990; Williamson, 2000). Given a certain institutional environment, the market often "fails" to effectively govern agrarian activity and resources. However, this does not necessarily mean "state intervention", as is the rule in Neoclassical Economics. Agrarian agents develop a variety of private forms, mechanisms and "institutions" to overcome market imperfections and to effectively govern their behavior, activities and relationships. The correct approach in the New Institutional Economics is to make effective choices between various alternative modes of (market, private, and public) governance, all of which have their own disadvantages and costs.

The analysis of the country's agrarian governance system is to include several stages. First, it is necessary to identify the various agents of agrarian governance and the specific nature of their relationships, interests, goals, opportunities, power positions, dependencies, effects, conflicts, etc. The farm entrepreneur or farmer is the main figure in agriculture who manages resources, technology and activity, and therefore the "first" component in the analysis of agrarian governance (Figure 1.2).

Other agents also directly or "indirectly" participate in the governance of the agrarian sphere by negotiating and/or imposing relevant conditions, standards, norms, demand, etc. These are the owners of land, labor, material, financial, intellectual, etc. resources that are interested in their effective agricultural use and preservation. Often, they participate in various coalitions with the farmer entrepreneur (informal partnership associations, formal firms, cooperatives, etc.) to realize more benefits. In turn, individual farmers form a variety of professional (business, not-for-profit, etc.) organizations and collective actions (initiatives, professional standards, lobbying, etc.) to better realize their goals and profit from joint activity.

This is the agriculture-related business (suppliers of materials, equipment, finance and technology and/or buyers of agrarian products) and end users. These agents impose socio-economic and environmental standards, specific support and demand for farming activities and services. For example, a large

number of large processors and food chains implement (voluntary and/or mandatory) standards for "quality", "eco-friendliness", "fairness", etc., which are their initiatives, generally accepted industry "codes of conduct" or the result of consumer pressure to "contribute" to socio-economic and environmental sustainability.

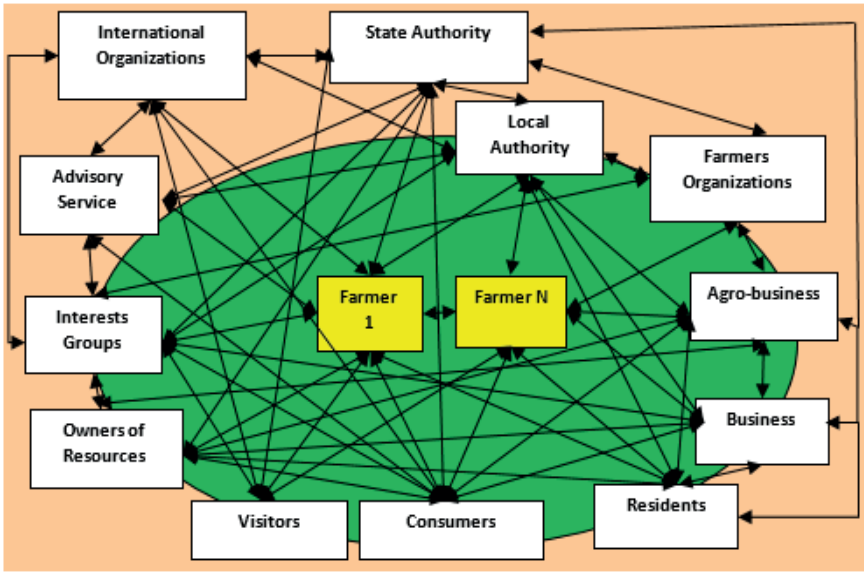

Figure 1.2. *Agents of Agrarian Governance in Bulgaria*

Source: Authors.

Next, it is the residents, visitors to rural areas, and the various interest groups that "set" the conditions (pressure, demand) for environmentally friendly, socially responsible and economically viable agrarian activity and areas. Finally, it is the state and local government, international organizations, etc. that support the agrarian sustainability initiatives of the various agents and/or impose mandatory (social, economic, environmental, etc.) production and consumption standards.

At this level of analysis, special attention is to be paid to the "personal" characteristics of individual agents involved in governance, since transaction costs have two "behavioral" origins - the bounded rationality and tendency of individuals for opportunism (Williamson, 2005). Agrarian agents do not have

all the information about the economic system (price differentiation, demand, trade opportunities, development trends) because collecting and processing such information is very expensive or impossible (multiple markets, future events, partner's intention to cheat etc.). In order to optimize decision-making, they incur costs to "increase their imperfect rationality" - data collection, analysis, forecasting, training, consulting, etc.

Besides, agents are also "opportunistic", and if there is an opportunity to obtain additional benefit with impunity from using institutions, contracted or market exchange, they are likely to take advantage. Agrarian agents are to protect rights, investments and transactions from the risk of opportunism by: ex-ante efforts to find a secure partner and design a form of effective partner cooperation; and ex-post investments to prevent (by monitoring, controlling, incentivizing cooperation) possible opportunism at the contract implementation stage (Williamson, 2005). The analysis has to distinguish the all possible types of opportunism: pre-contract (Adverse Selection), when a partner takes advantage of the "information asymmetry" and negotiates better terms of exchange; post-contractual (Moral Hazard), when a partner takes advantage of the impossibility of fully controlling his activity (by the other partner, a third party) or receives a "legitimate benefit" from unexpected changes in the terms of exchange (costs, prices, regulations); and "free riding" type inherent in the evolution of larger organizations – since individual benefits are not proportional to individual costs, there is a tendency for each to expect others to invest in organizational development and to benefit in case it is successful.

It is also necessary to analyze other significant factors of individual agents such as personal preferences, "discipline", ideology, knowledge, capabilities, propensity to take risks, reputation, trust, "contracting" power, etc.

Second, it is necessary to identify, distinguish, characterize and evaluate the principal mechanisms and forms that govern the behavior and activities of individual agents. These include (Figure 1.3):

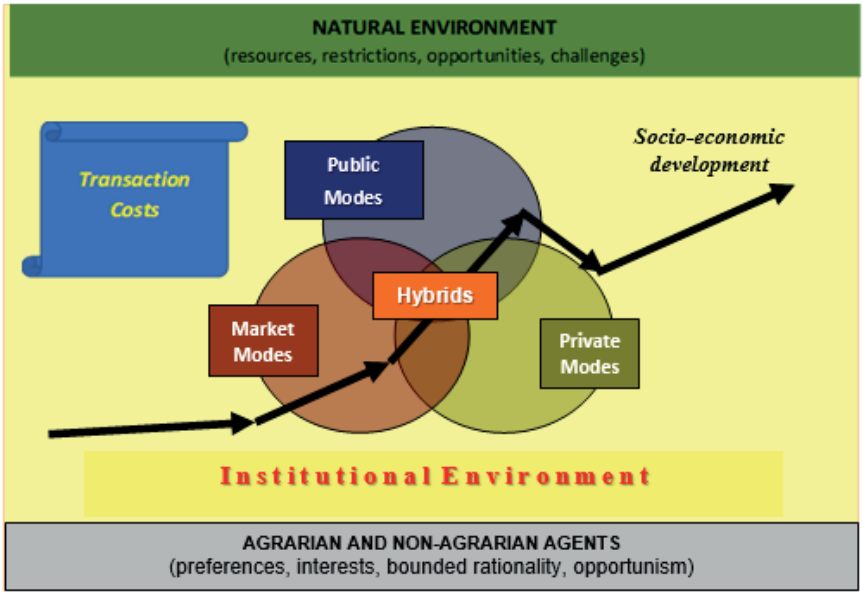

Figure 1.3. *System of Agrarian Governance*
Source: Author.

• *The institutional environment or the "rules of the game"* - this is the distribution of rights and obligations between individuals, groups and generations and the system for enforcement of these rights and rules (North, 1990; Furubotn & Richter, 2005). The spectrum of rights may include tangible and intangible assets, natural resources, activities, working conditions and wages, social protection, clean nature, food and eco-security, intra- and inter-generational justice, etc. Sanctioning of rights and rules is carried out by the state (administration, police, court, etc.), public pressure, trust, reputation, private forms, or is self-sanctioned by the agents themselves.

Part of the rights and obligations are determined by formal laws, normative documents, standards, court decisions, etc. There is usually strict government regulation of ownership, use, trade, etc. of agricultural lands and other natural resources, mandatory standards for product safety and quality, working conditions, protection of the natural environment, animal welfare, etc. There are also important informal rules and rights established by tradition, culture, religion, ideology, ethical and moral norms, etc., which are to be analyzed. In Bulgaria, many of the formal rights and rules "do not work" well and the informal "rules of the game" predetermine ("govern") the behavior of agents in society, and there is also a huge informal ("gray", "black") sector.

Institutional development is initiated by public (state, community) authorities, international politics (agreements, assistance, pressure) and private and collective actions of individuals. Bulgaria's membership in the European Union is related to the adaptation of modern European legislation (Acquis Communautaire) and better enforcement (external monitoring and sanctions in case of non-compliance by the Union). In the modern stage, many of the institutional innovations are also the result of the pressure or initiatives of certain interest groups – eco-associations, consumer organizations, etc. In the analysis, a qualitative characterization of the formal and informal institutional arrangement in agriculture is to be made, the effectiveness of the system for its sanctioning is to be assessed, and the incentives, limitations, costs and impact for a certain type of behavior and actions of the various agents is to be specified.

Institutional "modernization" is a long historical process, and individual components of the institutional environment have their own "logic" of development and life cycle lasting decades and centuries. In short periods of "normal" development, however, the institutional environment is usually "stable" because individuals can have little influence on institutions and institutional change. This is a major advantage because there is stable order and predictability, and therefore low transaction costs for agents. On the other hand, it is a significant drawback in the case of poor institutional arrangements, when the situation does not improve as "quickly" as the majority expects.

It is necessary to highlight and analyze the main elements of the institutional framework and their compliance with the European ones, take into account informal rules and restrictions important for the sector, assess the aggregate or (if possible) particular influence on the behavior, actions and relations of the agents, and effect in terms of transaction costs, and highlight the driving factors of institutional modernization (such as the Green Deal of European Union, reforming CAP, etc.) during the period.

• *Market forms or the "invisible hand of the market"* - these are the various decentralized initiatives governed by the movement of "free" market prices and market competition: spotlight exchange of resources, products and services, classic contract for purchase, rental or sale, trade with special high-quality, organic, etc. products and origins, agrarian and ecosystem services, etc. Individual agents use (adapt to) markets, profiting from labor specialization and mutually beneficial exchange (trade), while their voluntary decentralized actions "direct" and "correct" the overall distribution of resources among different activities, sectors, regions, ecosystems, countries etc.

However, there are many examples of lack of individual incentives, choice and/or unwanted exchange, and unsustainable development in the agrarian sector - missing markets, monopolistic or power relationships, positive or negative externalities, disparity in income and working and living conditions in rural and urban areas, etc. Therefore, the free market "fails" to effectively govern the overall activity, exchange and investment in the agrarian sphere and leads to low socio-economic and environmental sustainability. The analysis is to establish whether markets for agrarian resources and products work "well" (many sellers and buyers), ascertain the costs and benefits associated with market forms for different agents, and identify cases of "market failure" in contemporary conditions.

• *Private and collective forms or "private or collective order"* - these are various private initiatives and special contractual and organizational forms: long-term supply and marketing contracts, voluntary eco-actions, voluntary or mandatory codes of conduct, coalition (family, company, corporate, etc.) farms, partnerships, cooperatives and associations, trademarks, labels, etc. Individual agents take advantage of economic, market, institutional, and other opportunities, and overcome institutional and market imperfections by choosing or designing new (mutually) beneficial private forms and rules for governing behavior, activity, and relationships. Private forms negotiate their own rules or accept (enforce) an existing private or collective order, transfer existing or grant new rights to the partner, and protect the absolute (provided by the institutional environment) and contracted (given or exchanged by the participants) rights of agents.

At the modern stage, much of the agrarian activity is governed by voluntary initiatives, through private negotiations, the "visible hand of the manager", collective decision-making, or complex hierarchical internal management structures. However, there are many examples of the "failure" of the private sector to govern socially desirable activities - for example, preferred eco-conservation, preservation of traditional family farms and productions, preservation and renewal of rural areas, etc.

The analysis is to identify and evaluate the advantages and disadvantages of the various private forms of governance dominant in Bulgarian agriculture - main types of farms (individual, family, cooperative, firm, company, etc.), special contractual forms (purchase, hiring of assets, borrowing, insurance, sale, interlinked transactions, etc.), collective organizations outside the farm

gates, etc. For some of the transaction costs of these forms, there is available (statistical, reporting, etc.) or it is possible to collect reliable information from farm managers.

However, for much of the transaction costs lack the necessary information and it is necessary to apply qualitative Discrete Structural Analysis (Williamson, 2005) to determine the comparative efficiency of alternative governance forms. This is done on the basis of determining the "critical dimensions" of transactions[3] - these are the factors that determine the changes of transaction costs in the specific economic, institutional and natural environment. Since transactions have different critical characteristics and the governance forms have different comparative advantages it is to "align" transactions (which differ in their attributes) to governing structures (which differ in terms of costs and competence) in a discriminating (mainly transaction cost-saving) way" (Williamson, 2005). Depending on the combination of the specific characteristics of each activity/transaction, different most effective modes of governance of this activity will be efficient – market, contract, internal, trilateral, etc. (Figure 1.4).

Generic modes	***Critical dimension of transactions***								
	Appropriability								
	High								*Low*
	Asset Specificity								
	Low				*High*				
	Uncertainty								
	Low		*High*		*Low*		*High*		
	Frequency								
	High	*Low*	*High*	*Low*	*High*	*Low*	*High*	*Low*	
Free Market	⊤	⊤							
Special contract			⊤			⊤			
Internal Organisation					⊤		⊤		
Third-party intervention				🚑				🚑	
Public intervention									🚑

Figure 1.4. *Principal forms for governing agrarian transactions*

⊤ *- the most effective mode*; 🚑 *- a need for a third-party intervention*

Source: Authors

3 frequency of transactions with the same partner, uncertainty associated with transactions, specificity of assets to support a particular transaction (Williamson, 2005), and appropriability of rights associated with transactions (Bachev, 2010) have been identified as four critical dimensions of (agrarian) transactions and activities.

While examples of "good" institutional environment evolution are few (in a small number of highly developed democracies with prospering populations), examples of "successful" modernizations in "institutions of governance" are numerous (Williamson, 2000). In the specific institutional, market and natural environment, agents usually choose or design the most efficient private forms for governing their relationships and activities. Therefore, the identification of the dominant forms of private governance in the agrarian sphere or its individual areas, gives a good idea of the (most) effective forms for the specific stage of development.

• *Public forms or "public order"* - these are diverse public (community, government, international) interventions in the market and private sector such as: public recommendations, public regulations, public assistance, public taxation, public financing, public provision, public modernization of the institutional environment (rights and rules), etc. The role of public (local, national, European, etc.) governance is growing along with the intensification of activity and the exchange, and mutual (inter)dependence of socio-economic and environmental protection activities.

In some cases, it is possible that the effective governance of individual activity and/or the organization of certain activities through market mechanisms and/or through private negotiation may take a long period of time, be very expensive, fail to reach the socially desired scale, or may not be possible to be accomplished at all. Then centralized public intervention could reach the desired state faster, with less cost and more efficiently. However, there are many cases of poor public involvement (inaction, improper intervention, excessive regulation, corruption), leading to significant problems for sustainable agrarian development in Bulgaria and around the world.

The analysis of the agrarian governance in the country is to establish whether the "needs" for public intervention (the identified cases of market, private and collective failure) are effectively filled with the necessary public interventions, whether the most effective form of public intervention has been chosen among (politically, administratively, financially, etc.) feasible alternatives, and also to identify the cases of dominant public failures at the modern stage of development of the sector.

• *Hybrid forms* – some combination of the above three, such as public-private partnership, public licensing and inspection of private bio-farms, etc.

In the long term, the specific system of governance of agrarian sector (pre) determines the type and nature of socio-economic development (Figure 1.3). Depending on the effectiveness of the established agrarian governance system, individual farms, sub-sectors, regions, agro-ecosystems, and countries achieve unequal results in socio-economic development, with various challenges in the economic, social and ecological sustainability of individual farms, sub-sectors, regions, ecosystems and agriculture in general.

Third, like any economic process, agrarian governance is a complex, multi-layered, polycentric and multi-dimensional process that takes place over time and involves numerous agents who develop and use diverse forms and mechanisms of governance. A detail analysis of this process is to be done in relatively distinct governance subsystems - different levels (from farm level to national and European), functional areas (supply of labor, land, capital, etc.), farm types and organizations etc., establishing their specificity, needs and efficiency (Figure 1.5).

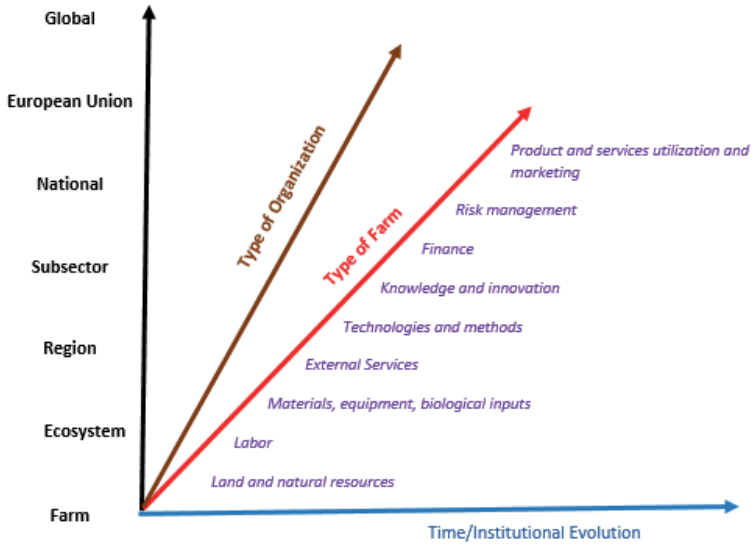

Figure 1.5. *Framework for Analysis of the Agrarian Governance System*
Source: Authors.

Particular attention is to be given to the identification and assessment of the dominant (most frequently used) forms of governance in the main functional

areas of different types of farms, and which are related to: supply and use of labor, land and natural resources, services, material assets, equipment and biological inputs, knowledge and know-how, innovation, finance, insurance and risk management, and realization (utilization, processing, marketing, etc.) of agricultural products and services. In addition, the diverse "collective actions" (organizations) in which farmers participate to induce private and/or public intervention in the market and private sector in their own interest areto be analyzed. In this way, all forms of internal and external economic integration in the agrarian sphere will be identified, analyzed and evaluated. In addition, other organizations in agrarian governance are to be analyzed - state, international, non-governmental, etc.

It is necessary to take a snapshot (short video) in order to be able to thoroughly analyze the diverse structures and processes in agrarian governance at the current stage. Where reliable information is available, comparisons is to be also made with previous assessments of governance at the farm level to see the dynamics during the period of the country's integration into the European Union and implementation of the Union's Common Agricultural Policies.

The identification of applied and other realistically possible forms of governance of transactions in different types of farms is to be the subject of a special micro-economic study. For this purpose, primary information is to be collected from farm managers and farmer organizations (including through the official agro-statistics) about the employed or preferred governing modes, factors for managerial choice, costs related to the governance of the main types of transactions, and the efficiency of governance of farming enterprise.

Fourth, the analysis of the agrarian governance system is to end with an assessment of the (final) result of this process - the state of the system and the final efficiency of the functioning of the agrarian system. If the welfare of the farmers is growing and the shops are full, there is "agrarian governance", otherwise there is "no governance". At this stage, depending on the scope of the analysis, a variety of data characterizing various aspects of the state of the agricultural sector and its subsystems are to be used - farm competitiveness, product and productivity dynamics, quality of lands, agrarian ecosystems, etc.

However, this approach allows seeing only the aggregate "current" (static) effect of diverse (governance) mechanisms and forms, and long-term (governing) processes and activities of numerous agents. An important methodological

issue is taking into account the "time factor", since many effects are the result(s) of old governance system(s), while many new and promising forms have not yet realized their potential effect(s)[4]. One of the directions for overcoming this problem is an assessment of the level of agrarian sustainability, which by definition is "future-oriented" (Bachev, 2010). Another direction is an "immediate" assessment of the compliance of the country's agrarian governance system with the principles of "good governance" - for example, those in the European Union[5]. A third approach seeks a solution in extending the period of analysis – for example, the Programing Period for the implementation of the European Union Common Agricultural Policy. None of these approaches, however, solves the challenge arising from the time factor in the analysis of socio-economic processes. Agrarian governance is a multi-layered dynamic system, and any "one-sided" assessment in "short" periods of analysis cannot claim to be inclusive.

4. Assessing the Quality of Agrarian Governance in Bulgaria

A "new" and constantly evolving concept of "Good Governance" has been increasingly used in the last three decades by the international, public, non-governmental and business organizations (AAID, 2008; ACML. 2020; DFID, 2010; Council of Europe, 2022; IFAD, 1999; OECD, 2015; World Bank, 2022), and is been a topic of "hot" academic debates of scholars in politics, economics, organization, development studies, international politics, behavioral sciences, socio-legal studies, etc. (Aguilera & Cuervo-Cazurra, 2019; Ali, 2015; Andrews, 2008; Bayyurt, Serin, & Arıkan, 2015; Cheshire, Higgins, & Lawrence, 2007; Dasgupta & Roy, 2016; Fukuyama, 2016; Higgins & Lawrence, 2005; Narzary, 2015; Riegner, 2012; Steffek & Wegmann, 2021; Tripathi, 2017; Weiss, 2000). The critical role of the (good) governance in facing important (economic, social, environmental, etc.) challenges and achieving organizational, business, community, and social (including global) goals has been well recognized by the scientists, decision-makers, and public at large (Coase, 1991; Bayyurt, Serin, & Arıkan, 2015; Ostrom, 2014; North, 1990; Williamson, 2005). Subsequently, attempts have been multiplying to specify and measure "how good or bad" that important factor of social development

4 Usually before any major crisis there is "normal governance", and conversely, a quick exit from the crisis requires "good governance".

5 A holistic approach for a multi-criteria assessment of the compliance of agrarian governance in Bulgaria to the principles of good governance in the European Union is presented by Ivanov & Bachev (2023).

is. Furthermore, there is increasing acceptance that the good governance is a broader category than administration, business, economic, etc. efficiency, and (besides the Government) it is to include multiple agents and ("universal") social, environmental, etc. dimensions and goals. Thus, good governance is to be studied and assessed simultaneously as a means, a goal, and a result of "sustainable" socio-economic development (Bachev, Ivanov, & Sarov, 2020).

The major principles of "good" governance were initially introduced by the World Bank and become a benchmark related to "the manner in which power is exercised in the management of a country's economic and social resources for development". Since 1996 the Worldwide Governance Indicators have been reported annually including six governance dimensions: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption (World Bank, 2022). In addition, principles of "good" Corporate governance were introduced by OECD in 1999 including Discipline, Transparency, Independence, Accountability, Responsibility, Fairness, and Social Responsibility (OECD, 2015). Since its introduction, the content and principles of good governance have been specified, enriched, and widely adopted by international, governmental, business, non-governmental, and other organizations. In the EU a larger set of principles for good "regional" governance have been formulated, monitored, and enforced including Fair Conduct of Elections, Representation and Participation, Responsiveness, Efficiency and Effectiveness, Openness and Transparency, Rule of Law, Ethical conduct, Competence and Capacity, Innovation and Openness to Change, Sustainability and Long-term Orientation, Sound Financial Management, Human rights, Cultural Diversity and Social Cohesion, Accountability (Council of Europe, 2022). Subsequently, many of these principles have been enshrined in national laws and regulations and/or accepted as voluntary (organizational, business etc.) standards for behavior in the Union and beyond.

Despite its widespread use still, there is no consensus about the content of the good governance and a unified approach to its "measurement". There have been suggested and applied multiple methods for assessing the compliance with the principles (standards, codes, characteristics, dimensions, best practices, etc.) of good governance at global, regional, national, corporate, NGO, sectoral scales, at different functional areas of activity (e.g. internet, R&D, environmental management, etc.), and management of major resources (land, water, etc.) and social challenges (e.g. climate change, biodiversity preservation, etc.). Applied

approaches for understanding and evaluating the system of governance mostly depend on the objectives of involved organizations and/or incorporated "methodological" frameworks. For instance, the assessments of the World Bank and some international and national donor agencies focus predominately on the public economic governance (extent of services provision, efficiency, corruption, etc.) in beneficiary countries; the framework applied by the EU, OECD, UN, and other organizations prioritize democracy, human rights, etc. aspects as well; the corporate sector puts primary attention on the safeguarding the of shareholders and (increasingly) stakeholders and social interests, etc. Similarly, political scientists and political economists are mostly interested in the "model" of governance and power relations, low scholars' study mainly formal legal "order", economists primarily investigate the (program, investment, transaction, third-party, etc.) costs and benefits, etc. The variation in the chosen "principles" and employed indicators for evaluating the "goodness" of governance creates confusion among different users and brings up criticism (Fukuyama, 2016). There is also a big criticism on applying a "Nirvana" approach which compares the real situation to some (Western, ideal, etc.) norms rather than to (an)other feasible "social arrangement(s)" (governance alternatives) in the specific conditions of a particular country, sector, region, agents, etc.

The holistic framework for assessing agrarian governance includes several steps: defining the components of the agrarian governance system; formulating the principles of good agrarian governance; specifying the assessment aspects for each principle; identifying the best indicators for each aspect; selecting the criteria and reference values for assessing the quality of agrarian governance for each indicators; and deriving the good governance assessment score (Ivanov & Bachev, 2022; Bachev and Ivanov, 2023).

Good Governance Principles are "universal" and relate to the best (desirable) state of the individual components of the governance system and the system as a whole. They are based on the widely accepted universal principle of good governance formulated by the international organization (EU, UN, FAO, etc.) and adapted to the specific conditions of agriculture. For instance, for the "specific" contemporary conditions of European Union (and Bulgarian) agriculture 11 (good governance) principles related to the individual component of agrarian governance have been selected by a Panel of Experts – Good Legislation, Respectful Informal Rules, Good Working Public Sector, Good Working Private Sector, Good Working Markets, High Transparency, Good Involvement, High Efficiency, Good Leadership, Equity and Solidarity, and High Synergy.

Aspects are precise standards ("measurement approaches") for each of the Principles representing a resulting state of the evaluated system when the relevant good governance Principle is realized. For contemporary Bulgarian conditions for every Principle 17 specific Aspects with their desired position have been identified by Panel of Experts – Supportive administration, No administrative deadweight, Efficient private sector, Accessible market, Fair competition, Confident level of awareness, Participatory decision-making, High return, Low transaction costs, High competency, Recognized promotion model, Gender equity, Fair distribution, High GAV agriculture, Stable employment, Competitive trade, and Resilient environment (Table 1.1).

Table 1.1. *System of Principles, Aspcets, Indicators, and Criteria for Assessing the Quality of Governance of Bulgarian Agriculture*

Principles	Aspects	Indicators	Estimation mode	Units
Good Legislation	Comprehensive legislation	Completeness of the legislation (1)	Experts assessment	Ranking score
	Justified enforcement	Degree of implementation and abide with legislation (2)	Experts assessment	Ranking score
		Level of regulation costs for get acquainted and to be enforced (3)	Experts assessment	Ranking score
Respectful Informal Rules	Mutual Trust	Level of trust between subjects in the agriculture (4)	Experts assessment	Ranking score
	Good Manner	Conflict level and contradiction state within agriculture community (5)	Experts assessment	Ranking score
Good Working Public Sector	No administrative deadweight	Level of unlawful payments and embezzlement (6)	Experts assessment	Ranking score
	Supportive administration	Satisfaction degree from administrative services (7)	Experts assessment	Ranking score
		Level of governmental spending for agricultural public administrating (agri-governmental expenditure unto total governmental spending) (8)	RCA method	Percent

Good Working Private Sector	Efficient Private Sector	Effectiveness of contracting among agents in agriculture (9)	Experts assessment	Ranking score
		Equality in the opportunities for development of different organizations forms (10)	Experts assessment	Ranking score
		Propensity to external contracting (contractual work to total output) (11)	RCA method	Ranking score
Good Working Market	Accessible market	Level of entry and exit market costs (12)	Experts assessment	Ranking score
	Fair competition	Competition fairness and avoiding price rigging (13)	Experts assessment	Ranking score
		Degree of market orientation (farm use and farmhouse consumption unto total output (14)	RCA method	Share
High Transparency	Confident level of awareness	Information awareness of stakeholders and agents in agriculture (15)	Experts assessment	Ranking score
		Costs level for information access of stakeholders and agents (16)	Experts assessment	Ranking score
		Decision-making transparency extent (17)	Experts assessment	Ranking score
		Symmetric between decisions taken and public expectations in agriculture (18)	Experts assessment	Ranking score
Good Involvement	Participatory decision-making	Plurality level in decision –making process in agriculture (19)	Experts assessment	Ranking score
		Level of unacceptable lobbying impairing third parties (20)	Experts assessment	Ranking score
		Scope of farm access to public agricultural support (% farms with direct payment/all farms) (21)	RCA method	Percent

High Efficiency	High return	Total spending of means and efforts for dealing with other economic agents and administration in agriculture (22)	Experts assessment	Ranking score
		Price rewarding potential (price index outputs/ price input index) (23)	RCA method	Index
	Low transaction costs	Level of transaction costs in the agriculture (total farm overhead costs/total input) (24)	RCA method	Share
Good Leadership	Recognized promotion model	Level of achieving own advantage on the expense of others through legal and illegal means (25)	Experts assessment	Ranking score
	Recognized promotion model	Correctness and decency in the business relationships in agriculture (26)	Experts assessment	Ranking score
	High competency	Degree of competency and expertise of agents in agriculture (27)	Experts assessment	Ranking score
	High competency	Entrepreneurship abilities and level of self-improvement of agents (28)	Experts assessment	Ranking score
Equity and Solidarity	Ethnical, religious and bigotry equity	Level of discrimination on the ethnical, religious and bigotry causes (29)	Experts assessment	Ranking score
	Fair distribution	Fairness in the remuneration of employees in agriculture (compensation of employees/factor income) (30)	RCA method	Share
	Fair distribution	Balance in the public support distribution in agriculture (Gini coefficient) (31)	RCA method	Coefficient

High Synergy	Stable employment	People engagement in agriculture (share of population employed in agriculture) (32)	RCA method	Percent
	High GAV agriculture	Significance of agriculture in the economy (GAV of agriculture per capita) (33)	RCA method	Euro
	Competitive trade	Importance of agriculture in the trade (agriculture export/agricultural import) (34)	RCA method	Index
	Resilient environment	Contribution of agriculture to climate change mitigation (% of greenhouse gases from agriculture in total GHG) (35)	RCA method	Percent
	Resilient environment	Soil protection and control of nitrogen pollution (quantity of nitrogen fertilizers use) (36)	RCA method	Kg per ha

Source: Bachev & Ivanov, 2023.

Good Governance Indicators are quantitative and qualitative variables of different types which can be assessed in the specific conditions of the evaluated system allowing measurement of compliance with a particular Aspect. The set of Indicators provides a comprehensive picture of the state of individual components of agrarian governance and the system as a whole. For the selection of the Governance Indicators a number of criteria, broadly applied in the sustainability assessment literature and practices, were used: “Relevance”, “Discriminatory power”, “Analytical soundness”, “Intelligibility and synonymity”, “Measurability”, “Governance and policy relevance”, and “Practical applicability” (Bachev, Ivanov, & Sarov, 2020). For the specific conditions of Bulgarian agriculture 36 indicators have been selected by the Panel of Experts (Table 1.1).

For assessing the particular goodness level, a system of specific Good Governance Criteria (best norms, range, standards, practices, etc.) for each Indicator are used. They are based on modern scientific research, European Union practices and standards, existing social contracts, etc. in the Bulgarian agriculture or in the evaluated subsystem of country’s agriculture. Good Governance

Criteria are the practically possible desired levels for each Indicator for the specific conditions of the evaluated agro-system. They assist the assessment of agrarian governance giving guidance for achieving (maintaining, improving) the best feasible standards for the particular components and the overall agrarian governance. Depending on the extent of the Criteria achievement the evaluated agro-system could be with a "good", "satisfactory" or "bad" governance. For instance, a higher or similar to the EU level correspond to good governance for a particular indicator, and vice versa.

Assessment and analysis of compliance to the principles of good agrarian governance are done for each indicator. Very often individual Indicators for each Aspect and/or different Aspect and Principles of governance with unequal, and frequently with controversial levels. That requires a transformation into a "unitless" Governance Index and integration of estimates. Diverse quantitative and qualitative levels for each indicator are transformed into a Governance Index applying an appropriate scale for each Indicator.

Initial assessment of the governance of Bulgarian agriculture was done is the end of 2022 using data from statistical and other official sources as well as assessments of an 8-member Panel of Experts including leading scholars, and representatives of governmental and farmers organizations. The difference between used two types of indicators is the estimation modes, as the later ones is based on scores of Experts from a 5-level ranking scale (Very low, Low, Middle, High and Very high). The assessment score of each indicator is determined by the desired state derived from the principle aspects and indicator criteria interpretation, which means that in some cases, "Very low" is equivalent of 0, whereas in other cases might refer to 1. For the remaining indicators of governance, the Relative Comparison Assessment Method is employed (Ivanov, 2022). The statistically generated data are from different databases on macro and farm level, including Eurostat, FADN database averaging for 3-year period (2018-2020) whole experts' judgments is done having in mind the recent years.

The common criteria used in this assessment is the average EU level and the medium EU situation. which is applied to provide the measurability and comparability of the assessment scores. The Good governance reference values are the practically observed indicators values on the counterpart EU average indicators. The later assist the assessment of agrarian governance giving guidance for achieving (maintaining, improving) the best feasible standards for the particular components and the overall agrarian governance.

The Integral Governance Index is computed through weighting Principal score assessment based on the principle number and component count. The Integral Governance Index of Bulgarian agriculture is represented by a qualitative score, which ranges from 0 to 1 that might be converted into qualitative assessment. For the purpose of this research are formulated five categories that Governance Index implies: "very good', "good", 'moderate", "satisfactory" and "bad" governance. These qualifications are linked to: Index range 0,81-1 for a "Very Good" governance; Index range 0.56-0,80 for a "Good" governance; Index range 0,46-0,55 for a "Moderate" governance; 0,21-0,45 for a "Satisfactory" governance and Index range less than 0,20 – referring to 'Bad or Unsatisfactory" agrarian governance. The governance assessment is oriented to the EU level, and therefore the Moderate rate is with a shorter range (plus or minus 0,05 deviation from the "average" EU value), while the extreme (Very Good or Bad) levels are kept in the normal 0.2 range in the 5 level Governance scale. Detailed explanation and justification of applied approach is done by Ivanov & Bachev (2023).

Initial approbation of the suggested framework has found out that the Integral Governance Index of Bulgarian agriculture is at moderate level having in mind the EU perspective. The highest performance is attained under the principles of Equity and Solidarity and the Good Working Public Sector while in terms of the Working Private Sector and the Stakeholders Involvements it is the lowest (Figure 1.6).

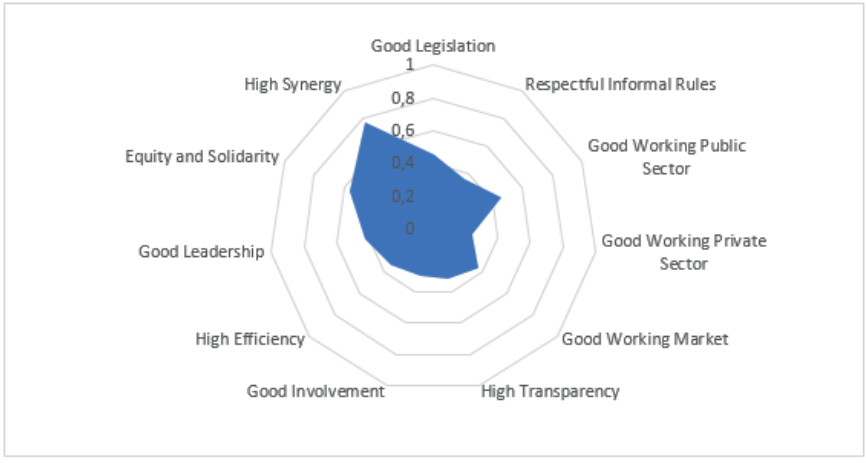

Figure 1.6. *Level of Good Governance of Bulgarian Agriculture for Major Principles*

Source: Authors' calculations

Analysis of individual indicators demonstrates that the strongest points of agrarian governance system in the country at the present stage of development are: Level of governmental spending for agricultural public administrating (agri-governmental expenditure unto total governmental spending), People engagement in agriculture (share of population employed in agriculture), Level of discrimination on the ethnical, religious and bigotry causes, Effectiveness of contracting among agents in agriculture, Importance of agriculture in the trade (agriculture export unto agricultural import), Degree of market orientation (farm use and farmhouse consumption unto total output), Completeness of the legislation, Level of regulation costs for get acquainted and to be enforced, and Correctness and decency in the business relationships in agriculture (Figure 1.7).

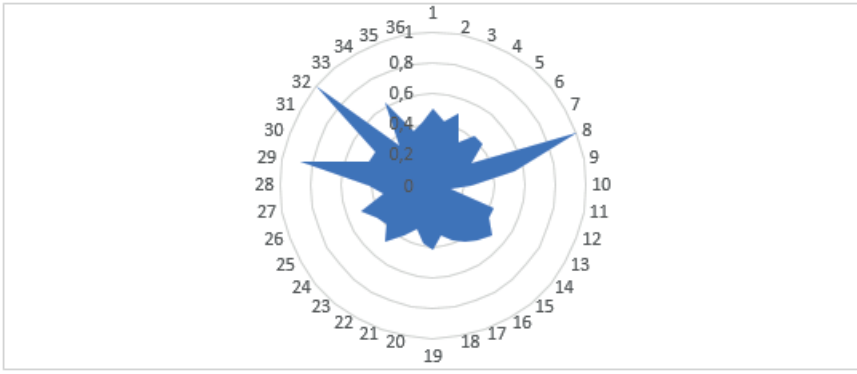

Figure 1.7. *Level of Good Governance of Bulgarian Agriculture for Individual Indictors*

Source: Authors' calculations

At the same time, the weakest point of the governance system of Bulgarian agriculture are identified as: Propensity to external contracting (contractual work to total output), Equality in the opportunities for development of different organizations forms, Satisfaction degree from administrative services, Scope of farm access to public agricultural support (percent of farms with direct payment unto all farms), Level of trust between subjects in the agriculture, Symmetric between decisions taken and public expectations in agriculture, and Degree of competency and expertise of agents in agriculture. In all these directions the efforts of responsible officials, farm and agribusiness managers,

professional organizations, and other stakeholders have to be directed though policies instruments, administration reforms, improvement of private and collective management, international assistance, etc. in order to improve the governance of agrarian sector in the country.

5. Conclusion

In this section, we have tried to prove that agrarian governance is a complex system that includes agrarian and related agents involved in management decision-making; rules, forms and mechanisms that govern the behavior, activities and relationships of agrarian agents; processes and activities related to making governance decisions; a specific social order resulting from the governing process and functioning of the system. Adapting the methodology of the New Institutional Economics allows to better understand, analyze and evaluate this complex system and its individual components. The analysis is to include the individual elements for the system, different levels of governance and the main functional areas of the farming, for each of which appropriate quantitative or qualitative methods of the institutional approach are to be used.

This study also demonstrated that the (quantitative) assessment of the governance system of Bulgarian agriculture and the level of its compliance to the principles of "Good governance" is possible. The latter is a "work in progress" and further refinements are necessary in terms of perfection of the hierarchical system of governance principles, aspects and indicators, its broader application into analysis of the governance system in major subsectors of Bulgarian agriculture (crop, livestock, etc.) and international comparisons between EU countries, as well as in appropriate data collection, including through official agri-statistics system.

Systematic theoretical and empirical research in this "new" field should be expanded to better understand this complex category and refine approaches to its economic analysis. For a better distinction and a more complete definition, a wider use of the term Governance in languages like Bulgarian (where there is no specific term to distinguish it from Management) is necessary, as is already the practice both in scientific circles and in colloquial speech.

Section 2

Governance Efficiency of Agricultural Farms

1. Introduction

In recent years there have been renewed academic, business, and policies debated about the efficiency of farms and agrarian organizations, the "future of agriculture", and prospects and contribution of different farming structures (Bachev, 2010a; Davidova & Thomson, 2014; FAO, 2021; Hoppe, 2021; James, Klein, & Sykuta, 2011; Massey, Sykuta, & Pierce, 2020; Sykuta & Cook, 2001). Numerous publications have appeared suggesting the "right" approaches for defining and evaluating the economic efficiency of farms as well as multiple assessments of efficiency levels in different countries, subsectors, types of farming organizations, ecosystems, etc. (Abdulai & Huffman, 2000; Asfaw, Geta, & Mitiku, 2019; Chetroiu & Călin, 2013; Combary, 2017; Debebe, Haji, Goshu, & Edriss, 2015; Gaviglio, *et al.,* 2021; Gunes & Guldal, 2019; Guth & Smędzik-Ambroży, 2020; Habtamu, Lien, & Hardaker, 2018; Hakim, Haryanto, & Sari, 2021; Skarżyńska, 2019; Tesema, 2021; Maurice, Adamu, & Joseph, 2015; Masterson, 2007; Masuku & Belete, 2014; Okoruwa, Akindeinde, & Salimonu, 2009).

Despite the progression of the theory of economic organizations in the last decades (Bachev, 2004; Furuboth & Richter, 2000; Ciaian, Pokrivcak, & Drabik, 2009; James, Klein, & Sykuta, 2011; Sykuta & Cook, 2001; Williamson, 1996), the farm predominately is studied as a "production structure" and its efficiency is assessed through traditional indicators for "technical", "production", "factors", "resources", "accountancy" etc. productivity. Significant factors affecting a farm's efficiency, such as transaction costs and capacity for adaptation to the market, institutional, technological, and natural environment, have been ignored in the economic analysis. Consequently, many "strange"

phenomena associated with farming evolution around the globe stay unexplained such as: why in a particular country, subsector, and region there is a huge variation in the levels of "economic" efficiency of farms; why for a long period of time there exist so many highly sustainable farms with "unsatisfactory" (low) productivity and efficiency; why farming adjustments is often associated with the transfer of resources management to "less efficient" (low productive) structures; why there are farms/firms and diverse agrarian organizations at all. In Bulgaria for instance, there has been enormous differentiation in the factor's productivity of individual farms, and holdings of different sizes, juridical types, product specialization, and geographical locations (Koteva, 2014; Kopeva & Ivanova, 2008; Zaimova, 2011). Furthermore, the ongoing restructuring of farming structures has been associated with the rapid transfer of resources management into larger agro-firms and cooperatives, and a significant decrease in the number of farms - one quarter in 2007 compared to 2003, and 73% by 2020 compared to 2007 (MAFF, 2021).

The interdisciplinary New Institutional Economics is a rapidly evolving methodology, which allows better understanding and assessing the efficiency of diverse forms of farms and agrarian organizations (Bachev, 2004; Furuboth & Richter, 2000; Mugwagwa, Bijman, & Trienekens, 2020; Sykuta & Cook, 2001; Valentinov & Curtiss, 2005; Williamson, 1996). It studies farms (not only as a production but) as a governance structure – as a form for the organization (governing) of agrarian transactions and minimization of transaction costs. In the last decades, in Bulgaria (Bachev, 2004, 2006, 2009, 2010b, 2016; Bachev & Nanseki, 2008; Bachev & Terziev, 2017, 2018; Bachev & Tsuji, 2001; Georgiev, & Roycheva, 2017; Radeva, 2017; Terziev, *et al.,* 2018; Terziyska, 2016) and internationally (Ciaian, Pokrivcak, & Drabik, 2009; Demir, 2016; Foster & Rosenzweig, 2022; Huy *et al.,* 2016; Massey, Sykuta, & Pierce, 2020; Mack *et al.,* 2019; Mugwagwa, Bijman, & Trienekens, 2020; Westerink *et al.,* 2017) there have been multiple studies incorporating this novel framework into the analysis of various governing structures in agriculture: different type of contractual arrangements, forms of farming organizations, modes of public intervention, farms sustainability and competitiveness, environmental and risk management, etc. In the majority of cases, the research on governance efficiency of farms is at a "theoretical" level, while few empirical studies focus on "critical factors" of transaction costs or their past (historical) rather than the current (and future) level. A well-known reason for that is the lack of any statistical, accountancy, farming, etc. data on diverse transacti-

on costs, and diverse modes of governance in individual farms. In addition, most of the absolute and comparative transaction costs associated with farm governance are not easily identified, measured, or separate from traditional "production costs".

This section incorporates the achievements of the New Institutional Economics and suggests a practical approach for assessing the level and factors of governance efficiency of Bulgarian farms as a whole and of different juridical types and operational sizes.

2. Methodology

2.1. Theoretical background

The New Institutional Economics studies farms and other economic organizations in agriculture as governing structures, and modes for minimization of production and transaction costs, and for maximization of production and transaction benefits (Bachev, 2010a; Bashev, 2012). It turns individual transactions into a basic unit of economic analysis, identifies alternative modes for governing transactions and activity (market, contract, internal, collective, hybrid, etc.), and assesses the efficiency of alternative (discrete) governance structures in a comparative (mainly transaction costs minimizing) way (Bachev, 2004; Williamson, 1996). What is more, it has been proved that the efficient boundaries (size) of a firm (an agricultural farm) is eventually determined by the transaction costs minimizing reasoning rather than technological (production costs) factors (Williamson, 1996). In Bulgaria for instance, there is no case of a minimum size of a farm that is (pre)determined by a technological factor e.g. a particular technology, technological non-separability, etc. Even an individual animal (e.g. a cow) could be managed by two or more independent farms (firms) – one feeding it, another milking it, the third selling out the milk, the fourth taking care of the cow's health and product safety, fifth raising calves, etc., and all transactions between involved agents governed through the market (contracts). Similarly, the domination of large complex, and diversified structures (agri-corporations, holdings, cooperatives, etc.), some reaching tens of thousands of ha, could be hardly explained by the technological need to explore the economy of scale and/or scope (Bachev, 2006, 2010b).

Modern farming is associated with significant transaction costs – for finding needed land, labor, finance, etc. resources and securing effective supply

(searching suppliers, negotiating prices and terms of purchase, rent, or hiring, contracting, enforcement and disputing contractual terms, protection of property, etc.), for coalition and managing relations with other agents (finding best partners, building partnership, formal registrations, coordination, controlling opportunism, organizational development, etc.), for marketing of farm products and services (finding best prices and buyers, negotiating, contracting, payments of fees and commissions, unused output, etc.), for adaptation to constantly changing market, institutional, technological, and natural environment (studying and compliance with environmental, quality, safety, etc. standards, finding and introducing innovations, participation in public support programs, payments of bribes and fees, etc.).

Following Coase's transaction costs economizing logic, the farm is considered efficient if it governs all its transactions and activity in the most economical (equally or more efficient) way compared to other feasible organization(s) - another farm(s), organization(s), public, hybrid, etc. modes (Bachev, 2004; Bashev, 2012). On the other hand, the farm is inefficient if it is: (1) oversized and carries costlier compared to another organization transactions and activity; or (2) undersized and it does not internalize highly efficient compared to another farm(s) or organization(s) transactions and activity. For instance, if a crop farmer purchased an expensive combine (low costs of funding through state support program) but have a high cost to supply needed farmland, labor force, and/or selling excessive capacity (providing harvesting service and renting out the combine) to optimize factors of production, it is inefficient, and vice versa. In addition, if the farm adaptation potential to permanently changing market, institutional, technological, and natural environment are good, its governance (and overall) efficiency is high. That is because it overcomes easily (low or no transacting costs) existing and other possible (future) transacting difficulties in resources supply and marketing exploring fully production (technological) possibilities and moving to the most effective state (size adjustment, alternative governance, etc.) (Bashev, 2012; Bachev, 2018). Alternately, if the adaptability of a farm is low it is not able to reach the equal or more effective state/size of (resources supply, internal organization, and marketing of output) transacting compared to another farm(s) and organization(s). Therefore, its governance efficiency and productivity of factors are low.

Farmers and other agents use a great variety of mechanisms and modes for governing their relations, transactions, and activity – free market (market

prices and market competition), contract, internal (private order), collective action (cooperation), hybrid (e.g. involvement in the public program), etc. If all functional areas of farm governance (all relevant transactions and activity) are associated with equal or fewer costs compared to the external governance (e.g. another farm or organization), then the analyzed farm is efficient. Alternatively, if some or all of the functional areas of farm governance command higher costs compared to another form of governance (another farm or organization), then the analyzed farm is inefficient.

"Rational" agrarian agents (farm entrepreneurs, suppliers of resources and services, buyers of farm produce, etc.) tend to organize their relations (transactions) and activity through the most efficient mode(s) of governance (Williamson, 1996; Bachev, 2010b). One extreme is when a farm entrepreneur specializes only in the management of farm transactions and organizes external supply of all needed agrarian resources, buys all needed production operations (technological activities) as services, and markets the entire output through the free market. For instance, the manager practices short-term rent of land, buys all cultivation services (plowing, fertilizing, plant protection, risk insurance, harvesting, transportation, etc.), and (spotlight) sells output at the wholesale market.

Another extreme is the close subsistence holding when a farmer uses only owned land, labor, savings, does all production operations, and consumes the entire output. Between these two extremes there are a great variety of forms for governing farm transactions, activities, and resources (farm sizes and types) aiming to explore technological possibilities (economy of scale and scope, minimize production costs), economize on (market, contract, internal, coalition, etc.) transaction costs, and maximize production and transacting benefits (income, market positioning, overcoming unilateral dependency, etc.). The efficient size and type of a particular farm will be determined by the comparative efficiency of the organization of agrarian transactions, activity, and resources in that farm in comparison to the organization of the same transactions, activity, and resources in another farm(s) or organization(s). That is the situation when all transactions and activity in the farm and the sector are carried out with minimum total (transaction and production) costs. On the other hand, if the farm organizes its transactions, activity, and resources at higher costs compared to another farm(s) or organization(s), then there will be a potential to increase efficiency through transferring certain transactions, activities, and resources to external governance (another farm, organization, free market, etc.).

Unfortunately, described "logic" of economic efficiency of farms is theoretically easily justified but still very difficult to operationalize and practically applied. However, assessment "difficulties" associated with the transaction costs and governing modes is no excuse to overlook these important features (the essence) of farm efficiency. This study just suggests one of the possible ways (approach) to start dealing with that important economic problem.

2.2. Method and data

In Bulgaria, like in other countries around the globe, there are no available statistical or other data about the structure and level of transaction costs in agriculture, nor about most of the dominant modes for governing agrarian transactions (formal land lease and sell contracts, and formal labor contracts being an exception). Furthermore, there have been no successful attempts for mass collection of such data and evaluating (measuring) and comparing directly the total costs of each individual transaction of the farms and other agrarian organizations. The latter is quite difficult, too costly, or most often practically impossible - e.g. separation of the transaction from pure "production" costs, simultaneous and/or interlinked organization of transactions, etc.). That is further complicated by the high specificity depending on: the skills (ability) of individual farm managers, multiple and interlinked characters of governance, the unique conditions of farm production, exchange, and external environment, etc. The same is true for the adaptation capability of individual farms and other agrarian organizations which assessment is still a great challenge for economists.

In this study, another approach for assessing the comparative transaction costs of farms is suggested and experimented with. First, instead of evaluating transaction costs of each individual transaction, the transaction costs of each class of farming transactions are assessed – these are related to effective supply and management of needed resources (land, labor, inputs, finance, innovation), and marketing of produce and services (Figure 2.1). It is well known that even the founding fathers of the New Institutional Economics (Coase & Williamson, 1996) evaluated alternative governance structures not in terms of an individual transaction but for a type of transactions (e.g. outside transactionS are internalized into a firm if they are associated with high asset specificity, frequency, and uncertainty (Williamson, 1996).

The aggregate assessment of all classes of transactions is not a shortcoming of the applied method since if the governance of a particular transaction fails but it is effectively replaced by another mode(s) of governance (e.g. a market mode such as a bank loan is replaced with an inputs supply interlinked with crediting), the effective governance of a particular resource, activity, etc. is secured and overall efficiency achieved. What is more, each class of transactions of farms usually comprises of a certain type or few types of transacting – e.g. a labor hire contract, a short-term lease for land, a marketing contract with a processor or standard sells on wholesale market, etc. Consequently, if the governance of all major functional areas of the farm (class of transactions and activity) is effective, then both the overall transaction costs of the farm and the "combination of factors of production" (production costs) are optimized, and vice versa.

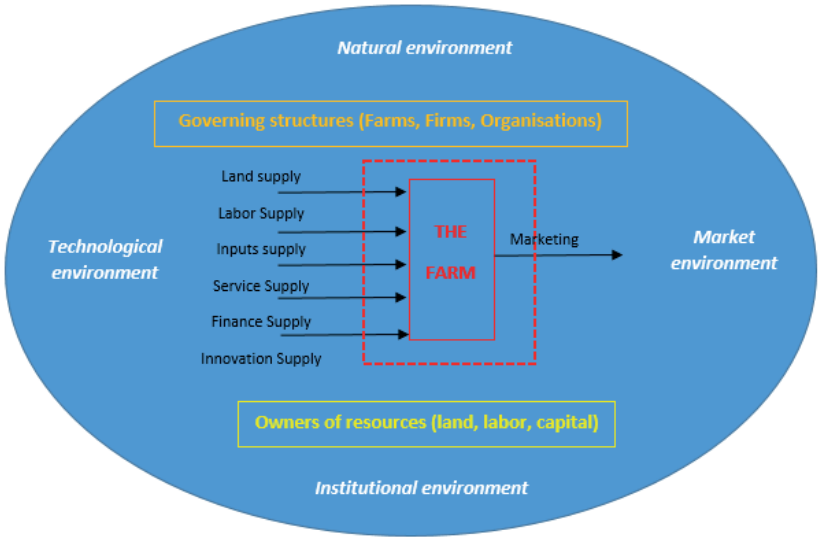

Figure 2.1. *Factors of Governance Efficiency of the Farm*

Source: Authors

Second, on the basis of multiple case studies, in-depth interviews with farm managers, and expert assessments, "the best" (easily understood, measured, and representative) quasi indicators for governance efficiency of farm transactions have been selected – namely "problems for effective organization of

needed class of transactions and activity". For instance, serious difficulties say in the supply of needed labor or marketing (shortage, high costs, lack of long-term commitment, competition with other producers and/or import, etc.) of a particular farm means that another farm(s)/firm(s) or organization (s) govern more effectively available resources (labor, etc.) than the analyzed farm.

Here correlation with the farm comparative transaction costs, production costs, and adaptation potential are significant. Thus, "measurement" problems are overcome through the assessment of relative costs for the organization of a particular class of transactions in the analyzed farm compared to other possible organizations (e.g. another farm, another organization, free market, etc.). There is no other agent (e.g. researcher, expert, etc.) but the manager of each farm who knows well (easily specified through learning by doing) the particular production and exchange conditions of his/her holding, including the amount of required outside exchanges, farm's needs for governing relations (coalition, contracting, etc.) with other agents, internal needs for the combination of factors of production, the severity of problems in the governance of inputs supply, internal organization, and marketing, opportunities and restrictions for the farm development from evolving market, institutional, natural, etc. environment.

Necessary microdata for the assessment of efficiency of Bulgarian farms is collected through a large scale survey of farm managers carried out with the assistance of the National Agricultural Advisory Service and the major producers' organizations in the fall of 2020 and involving 319 managers of "typical" farms of different types, production specializations, and geographical locations. The surveyed farm accounts for 0.42% of the registered agricultural producers in the country and their structure approximately corresponds to the real structure of the farms in Bulgaria.

Individual farm managers were asked about the "Nature of the problems in the effective organization" for every major class of farm transactions for securing needed factors of production and realization of output, including the "Effective supply of necessary for the farm land and natural resources", "Effective supply of necessary for the farm labor force", "Effective supply of necessary for the farm materials, equipment, and biological resources", "Effective supply of necessary for the farm funding/finance", "Effective supply of necessary for the farm services", "Effective supply of necessary for the farm innovations and know-how", and "Effective marketing and utilization of farm products and services". The keywords here are effective and needed

for the farm, which implies that both production and governance efficiency is achieved – the necessary for the farm resources supplied, the combination of the factors of production optimized (production costs minimized and output maximized), all products utilized or sold, all possible adaptation made, associated transacting costs minimized and transacting benefits maximized.

The surveyed managers are asked to evaluate the extent of the problems for the effective organization of each class of transactions in their particular farm as "Significant", "Normal" or "Insignificant". The "Significant" problems in the effective organization of a particular type of "necessary for the farm" transactions indicate that (a) the specific inputs supply, and/or combination of the factors of production, and/or the marketing and utilization of output is not carried out or governed at the effective scale (e.g. under or distracted supply of needed resources, not optimized factors of production and technology, unsold or unutilized produce, etc.); and/or (b) it is organized more costly (inefficiently) comparing to other possible organization (e.g. another farm or organization). In either case, it means high transaction costs and low (non) efficient governance. Accordingly, the "Normal" problems correspond to normal transaction costs and good governance efficiency, while the "Insignificant" problems are a quasi-indicator for the low transaction costs and high governance efficiency.

Furthermore, the classification as Significant also indicates that the farm adaptability is low since neither adequate adaptation has been made nor further adaptation is possible to achieve the state of farm efficiency. Consequently, the evaluated farm governance efficiency is considered to be low and it will unlikely sustain in a long term independently from the registered actual level of factors productivity in that holding (e.g. high, normal or low level of "technical" productivity of labor, land, etc., "profitability" of costs and capital, etc.). Such a farm does not have the adequate potential for adaptation to get to the effective state of organization of (all of its) transactions exploring the existing potential to increase efficiency and carry all transactions in the most effective way (equal or better than other farm or organization). That farm is incapable to change the governing modes (e.g. direct marketing with long-term sales or interlinked contract) or otherwise optimize transactions (for instance, replacing one type of transaction and resource with another type like in the case of labor with services or mechanization), or reduce farm size and the overall size of governed transactions, activities and resources (e.g. stop using services or certain inputs).

Thus it is not efficient in governing transactions, activity, and resources, and likely cease to exist in near future due to failure, takeover, merger, or another type of organizational modernization (restructuring, changing into the firm mode or corporation type, vertical integration, cooperation, etc.). Similarly, "Normal" and "Insignificant" problems correspond to the good and high governance efficiency of the farm.

Therefore, the assessment of governance efficiency of farms is made directly without specifying highly diverse governing modes for every individual transaction and type (class) of transactions in every particular farm, nor the absolute level of transaction costs and farm's adaptation potential.

Next, the qualitative assessments of the managers for the governance of a major class of transactions were transformed into quantitative values, as the Insignificant was assessed with 1, the Normal with 0.5, and the Significant with 0. The latter quantification gives a precise idea about efficiency and its levels distinguishes clearly the inefficient (0) from the good (0.5) and highly (1) efficient governance.

For each of the agricultural holdings, an Integral Governance Efficiency Index is calculated by multiplying the quantitative value for each type of transaction. The Index of Governance Efficiency of farms as a whole and farms of different types (specialization, location, etc.) were obtained as an arithmetic average from the individual indices of the constituent holdings. In order to determine the level of Farm Governance (and the overall) Efficiency, the following benchmarks were used: Low – 0 (one or more major classes of transactions are governed inefficiently), Good – bigger than 0 to 0.094 (less than a half of all major class of farm transactions are with Insignificant problems), and High - 0.095 to 1 (more than a half of all major class of farm transactions are with Insignificant problems).

For assessing the Production Efficiency of individual holdings traditional indicators for Labour Productivity and Profitability are used as levels close to the average for the sector are classified as Good, while these significantly above or below the average as High and Low accordingly.

The "Subjectivity" of farm managers' first-hand assessments incorporated in the suggested novel approach is not a big issue since: there is no other data available or source more reliable; there is a big number of surveyed farms which give quite a precise aggregate picture for the performance of farms

as a whole and farms with different type and location. What is more, for the evaluation of real-life efficiency the subjective assessments of farm managers are useful since most of the factors of transaction costs, governance choice, production output, etc. depend on the personal characteristics of the managers such as stills, knowledge, experiences, perception, preferences, etc. (there are good managers, and there are bad managers). Besides, it is important not to "measure" precisely the level of transaction costs but to determine the level of efficiency, identify critical factors compromising it, and suggest practical tools for assisting farm management and public policies for improving the sustainability of farms of different type and location.

3. Levels of Governance Efficiency of Bulgarian Farms

This study has found that the Governance Efficiency of Bulgarian farms is at a Good level (Figure 2.2). Nevertheless, the Integral Index of Governance Efficiency of the sector is relatively low (0.017). The latter is a consequence of the fact that only 32% of the Bulgarian farms are with a Good level of governance efficiency, and merely 5% with a High one (Figure 2.3). Just above 60% of all the farms in the country are with unsatisfactory (Low) level of governance efficiency. Therefore, a significant part of the agricultural holdings in the country will likely disappear shortly due to the low efficiency and adaptability.

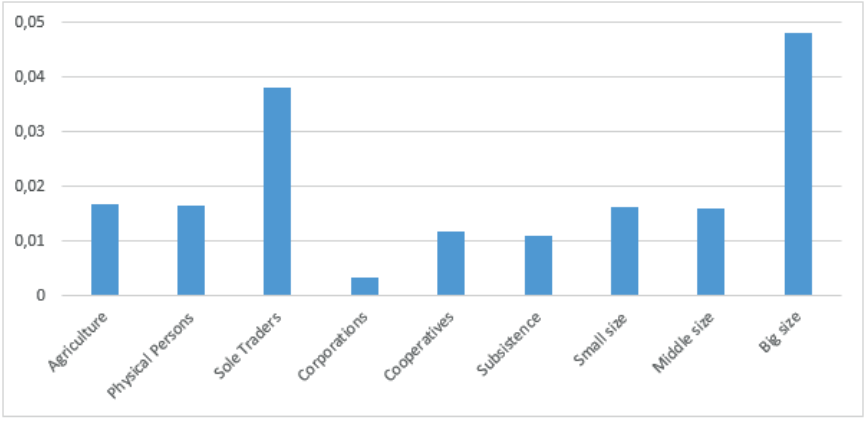

Figure 2.2. *Level of Governance Efficiency of Farms of Different Juridical Types and Sizes in Bulgaria*

Source: Authors' calculation

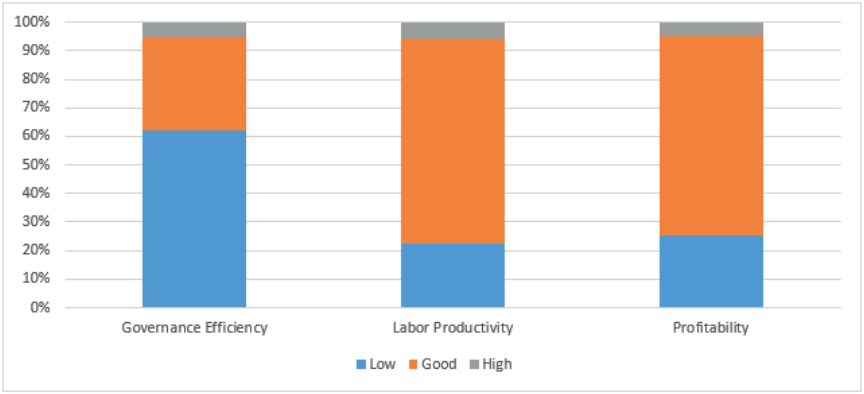

Figure 2.3. *Share of Farms with Different Levels of Governance Efficiency, Labor Productivity and Profitability in Bulgaria*

Source: Authors' calculation

The discrepancy in the precision of the applied framework with the traditional "production function" approach and indicators for farm efficiency, like Labour Productivity and Profitability, is quite big (Figure 2.3). The latter assessment is very misleading and shows a substantial proportion of farms with superior (Good or High) levels of efficiency – 78% and 75% accordingly. Therefore, it does not give a good insight to decision-makers about the real efficiency and sustainability of farms (particularly for the those with good and low levels) and has to be used cautiously in the economic analysis.

The major factors for the inferior overall governance efficiency of Bulgarian farms are the Low levels of efficiency in the Supply of Necessary Labour Force, the Supply of Necessary Innovations and Know-how, and the Supply of Necessary Funding, prevailing for 30%, 27%, and 21% of all agricultural holdings in the country (Figure 2.4). At the same time, the factors mostly contributing to increasing the overall efficiency level are the Good or High efficiency in the organization of the Supply of Necessary Services, Land and Natural Resources, and Materials, Equipment, and Biological Resources.

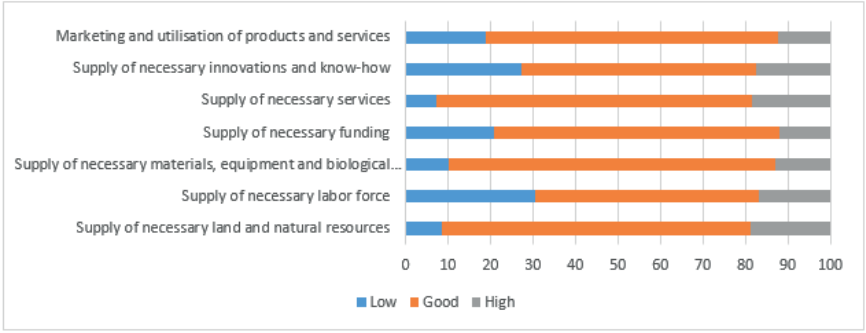

Figure 2.4. *Share of Bulgarian Farms with Different Levels of Governance Efficiency in Organisation of Major Transactions and Activity (Percent)*

Source: Authors' calculation

There is a great variation in the level of governance efficiency among the farms with different juridical types and operational sizes (Figure 2.2). With the highest governance efficiency are the Sole Traders and the enterprises with a large size for the sector. At the same time, the level of governance efficiency of the corporative and cooperative farms and "semi-market" (predominately subsistence) holdings is lower than the sector's average.

The share of all commercial farms with a low level of governance efficiency is substantial with the exception of the Cooperatives among which all are with good governance efficiency (Figure 2.5). Subsistence farms with low and good governance efficiency levels are equally distributed. The biggest number of farms with a high governance efficiency is among Sole Traders and large-scale operators. These figures give new insights on the extent and directions of likely prospects for the process of further restructuring of Bulgarian farms and transfer of management of resources and activities from farms with low efficiency (mostly small size and unregistered holdings) to more efficient enterprises (mostly large-size business farms and cooperatives).

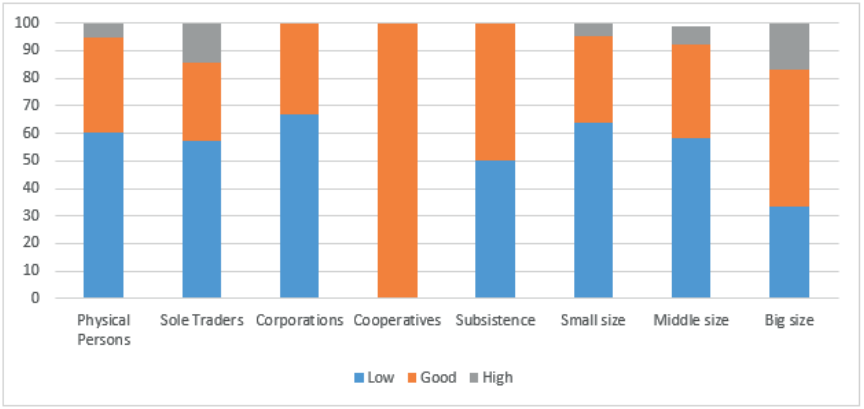

Figure 2.5. *Share of Farms of Different Juridical Types and Sizes with Different Levels of Governance Efficiency in Bulgaria*

Source: Authors' calculation

This analysis let also identify specific factors responsible for the low governance efficiency of different type of Bulgarian farms (Figure 2.6). The significant difficulties (the high transaction costs) in the supply of needed labor, finance and innovation, and in the marketing of output, is critical for the maintaining efficiency of a significant number of Physical Persons. For the good proportion of the Sole Traders, the most important factors restricting efficiency are the high transaction costs for the supply of needed land and natural resources, funding, and innovations and know-how. For the majority of corporations, the critical factors are an inefficiency in the supply of needed labor force, materials, equipment, and biological resources, and financing. Similarly, low efficiency in the supply of necessary labor is most important for the small and middle-size holdings, the serious difficulties in the supply of need finance for subsistence and small scale holdings, an insufficient supply of innovations and know-how for the good number of smaller-scale operators, and the marketing difficulties for a great segment of all size farms. All these figures give some good insights on the critical factors restricting efficiency and development (enlargement, modernization) of different types of Bulgarian farms and are useful for designing management strategies and policies support for different types of farming enterprises.

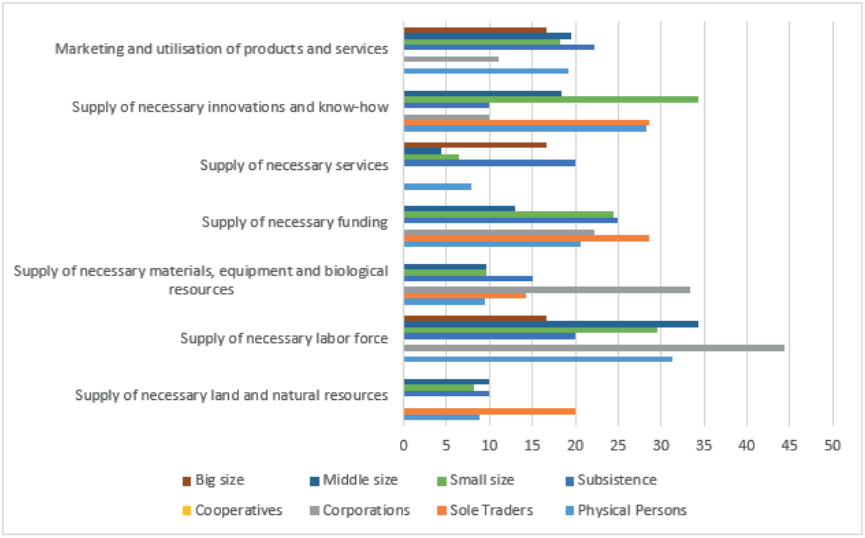

Figure 2.6. *Share of Bulgarian Farms of Different Juridical Types and Sizes with Significant Problems in Efficient Organisation of Major Transactions and Activity (Percent)*

Source: Authors' calculation

4. Factors of Governance Efficiency of Bulgarian Farms

The study of governance efficiency of Bulgarian farms let identify the critical personal, market, institutional, technological, environmental, etc. factors responsible for its state and evolution.

For the greatest majority of the managers of Bulgarian farms with a good governance efficiency, there are a big variety of market, internal, external, institutional, and personal factors contributing to the increasing their competitiveness (Figure 2.7). These kinds of enterprises are with good efficiency and adaptability and use (look for) all internal and external opportunities for ameliorating their governance (and overall) efficiency to the highest level.

At the same time, for a few farms with a high governance efficiency, there are significant internal and external factors for increasing their competitiveness. That is because they have already adapted to the most efficient state exploring fully transacting and production possibilities, and there are no additional factors (potential) for increasing the status quo.

On the other hand, for the considerable farms with a low governance efficiency the most critical factors for improving their inferior competitiveness le-

vels are Available information, Access to knowledge, advice, and counseling, Direct state subsidies received, and Participation in state support programs, while their insufficient adaptability to Market conditions (supply and demand, prices, competition) is important for the low governance efficiency level.

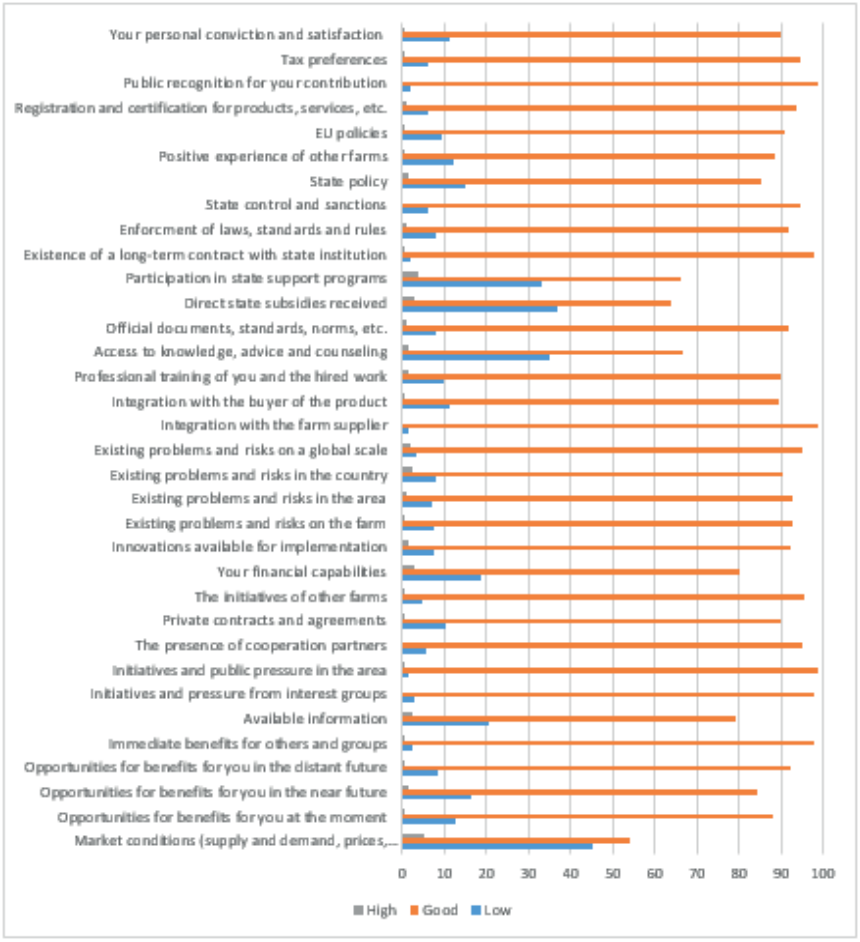

Figure 2.7. *Factors contributing the most to increasing the competitiveness of Bulgarian farms (percent)*

Source: Authors' calculation

Similarly, merely a few managers of farms with a high governance efficiency indicate there are policy instruments that could further increase their efficiency level (Figure 2.8). That is a result of the fact that all adaptation to policies support and regulation has been effectively made and maximum efficiency level successfully reached.

Simultaneously, for a great portion of farms with a good governance efficiency, all policies instruments are important, since they are in the process of adaptation and full exploration of institutional (support, regulatory, etc.) possibilities for increasing efficacy.

On the other hand, according to the good portion of managers of farms with a low governance efficiency only policy factors able to improve their inferior competitiveness levels are Direct subsidies per unit of land area (Area based payments), National payments (tops ups) for products, animals, etc., Professional training and advice, Support for Modernization of agricultural holdings, and Support for small and medium farms.

All these critical factors have to be taken into account in the process of modernization of public support policies for increasing the efficiency, sustainability, and competitiveness of Bulgarian farms.

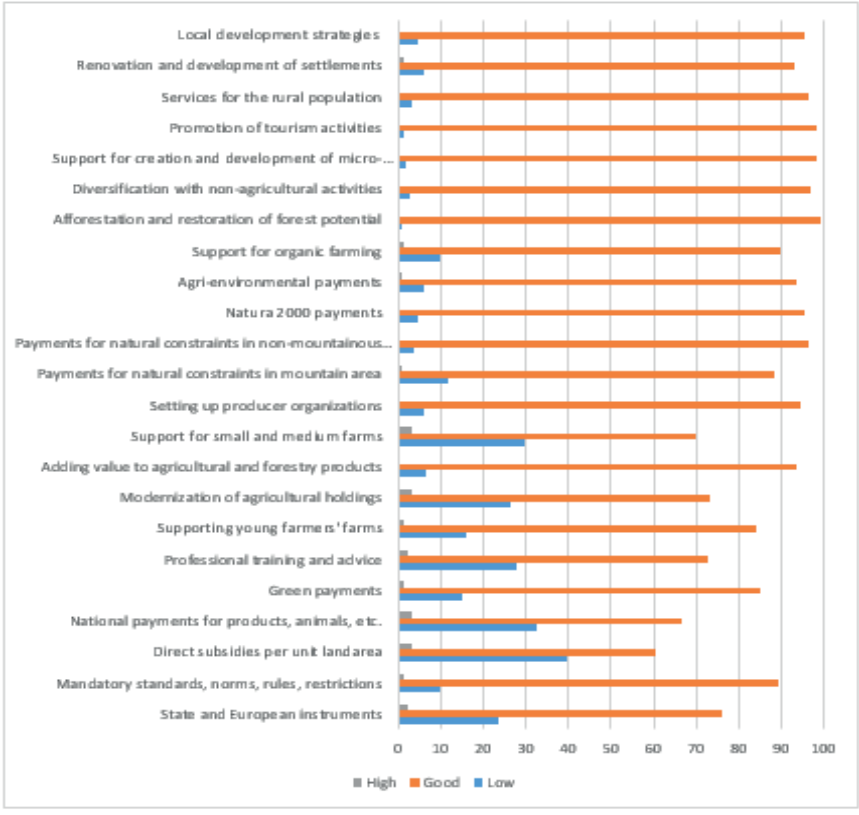

Figure 2.8. *Policy instruments most increase the competitiveness of Bulgarian farms (percent)*

Source: Authors' calculation

Not surprisingly only a few farms with a high level of governance efficiency are planning some size, organizational, technological, etc. changes in the near future (Figure 2.9). That is a consequence of the fact that these types of enterprises have reached a high-efficiency level optimizing production and transaction factors, and need no further adaptation to improve their governance and overall efficiency.

On the other hand, most of the farms with a good level of governance efficiency are planning certain size, organizational, technological, etc. adjustments and modernization in the near future. The efficiency and adaptation capability of that group of farms is good but still, there is some room (potential) for increasing efficiency of production and/or transaction factors.

In order to reach the high efficiency (equilibrium) state, the farm managers are designing certain appropriate for their specific conditions changes in operational size, products structures, technologies, governance of relations with other agents, etc.

Finally, only a few farms with a low level of governance efficiency are planning some radical changes in organizational, production, technological, etc. structure due to inferior efficiency and adaptability. Nevertheless, almost one-third of farm managers are planning to expand farm size in the near future trying to explore transacting and technological opportunities and improving their governance (and overall) efficiency.

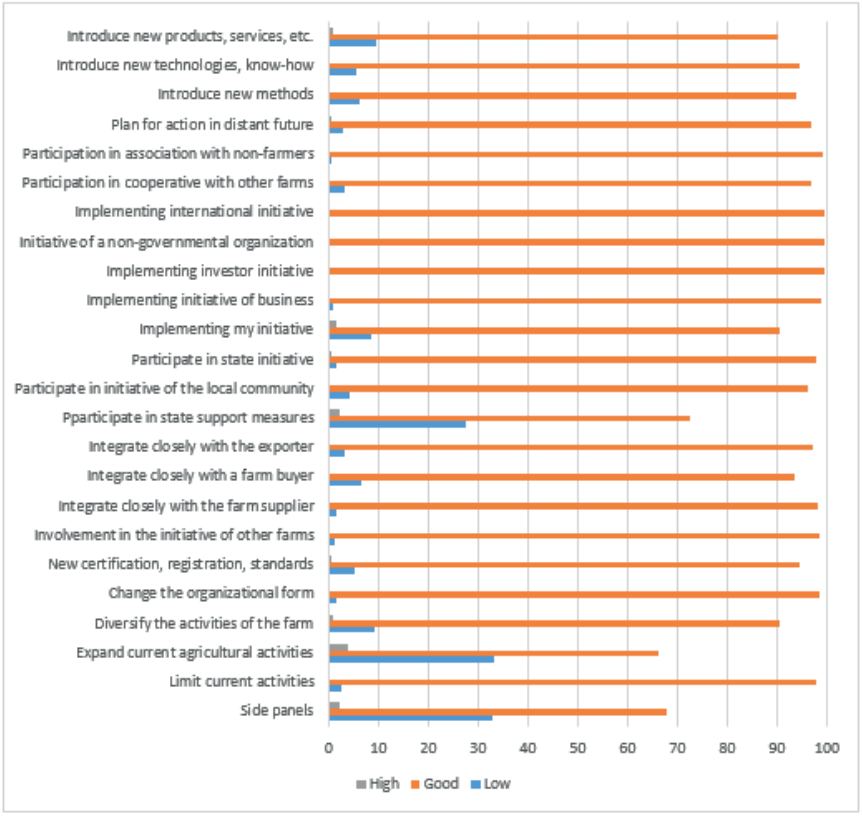

Figure 2.9. *Intentions of farm managers related to holdings development in the near future (percent)*

Source: Authors' calculation

As far as the nature of the impact on farm efficiency and competitiveness from the "introduction of the innovative business model of management" merely 22% of Bulgarian farms expect a significant effect (Figure 2.10). What is more, almost 23% of all farm managers are not able to assess the likely impact of their holding from such organizational innovation.

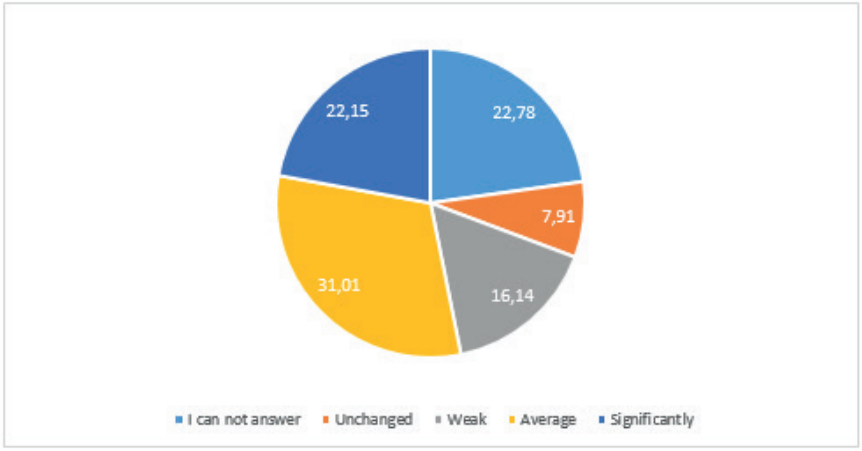

Figure 2.10. *How will the farm competitiveness increase, when innovative business model of management is introduced? (percent)*

Source: Survey with farm managers

There is considerable differentiation in the perception of the farmers about the opportunities from the introduction of innovative models of management depending on the governance efficiency of their farms. Among farms with a good governance efficiency, 84.5% believe that introducing an innovative business model in the management will increase competitiveness Significantly. It demonstrates that farms with good governance efficiency and adaptability see a great potential to increase competitiveness and are capable to explore it.

At the same time, among farms with low and high governance efficiency, the share of farms foreseeing a "significant" improvement in competitiveness associated with the introduction of an innovative management model is relatedly small – 14.8% and 1.6% accordingly. For the former group, the majority of farmers do not know or see the only limited possibility of improving the governance (and overall) efficiency, because of the low farms' capability for effective adaptation to higher efficiency levels. For the latter group, all feasible managerial innovations that could increase efficiency have been already successfully introduced, all possible adaptation to explore economies on production and transaction costs made, and there is no available innovation in management that contributes to enhance (the high) efficiency.

5. Evolution of the Governance Efficiency of Bulgarian Farms

There is no systemic and representative data for comparing the evolution of governance efficiency of Bulgarian farms. However, there are comparable 2016 data for 190 "typical" farms collected to assess the Governance sustainability of the country's agricultural holdings (Bachev, 2018). For obvious reasons, the sample of surveyed farms is smaller and not identical, and a certain (good) number of the interviewed 2016 holdings most likely were not existing in 2020 (e.g. the low efficient and sustainable ones). Nevertheless, the applied approach for the assessment of farm efficiency is the same, and the estimates of its levels give some insights into the evolution of governance efficiency during that period.

In 2016 the governance efficiency of Bulgarian farms was at a good level. However, the Index of Farm Efficiency was much lower than the 2020 level – namely 0.006 against the late one of 0.017. Thus there has been progressive evolution (an increase) in the governance efficiency of Bulgarian farms, as a result of effective adaptation and restructuring of holdings. That finding is in line with the statistical data about the evolution of agricultural holdings in the country during the same period (MAFF, 2021).

The share of low efficient farms in 2016 was much smaller than in 2020, the portion of farms with good efficiency was significantly higher, while those with superior efficiency were approximately similar (Figure 2.11). During the analyzed period the share of farms with low efficiency rose almost 38%, while those with good and high efficiency declined by 37% and 8% accordingly. Consequently, the share of efficient farms (with good and high governance efficiency) was reduced by almost two-thirds. Therefore, there is a deterioration of the governance efficiency of a large number of Bulgarian farms due to the high transaction and production deficiency and low adaptability to rapidly changing market, institutional, technological and natural environment.

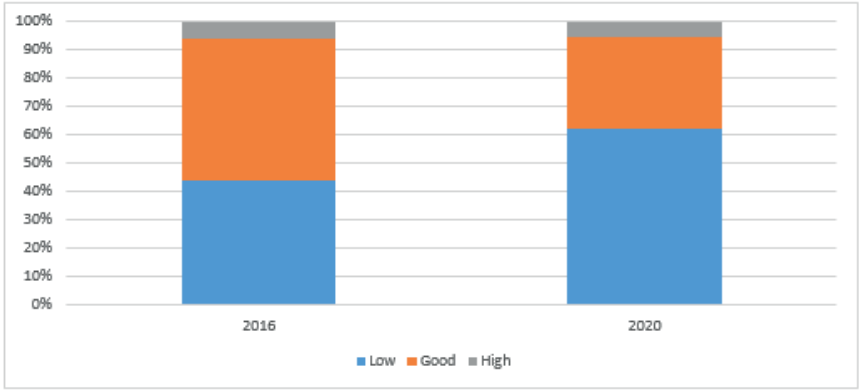

Figure 2.11. *Share of Farms with Different Levels of Governance Efficiency in Bulgaria in 2016 and 2020 (percent)*

Source: Authors' calculation

Presented attempt to assess the governance efficiency of Bulgarian farms confirms some "well-known" things about the economic efficiency of the country's farms as well as shed new light on the most critical factors of "real" efficiency and sustainability of analyzed individual farms, and farms of different type and locations. Particularly, it highlighted important prospects related to the speed, factors, and direction of contemporary restructuring of farming organizations in the country. This first-in-kind "quantitative" assessment of the governance efficiency also has confirmed the results of previous qualitative analyses on the governance efficiency of the country's agricultural holdings in general and different types (Bachev, 2010b; Bachev, 2018; Bashev, 2012). Lastly, this assessment has proved that the specific efficiency of an individual farm is determined by a spectrum of specific (personal, production, organizational, management, market, ecological, etc.) factors resulting in big variation in efficiency levels in each particular group (juridical type, size, specialization, etc.), all of which have to be carefully identified and analyzed. Therefore, "theoretical" approval or rejection of one or another mode or form of governance or farming organization is not justified.

This approach is just an attempt to assess "fully" the economic efficiency of Bulgarian farms and has to be further tested and improved. In addition, the comprehensive evaluation of the overall efficiency of farms of a different type is to includes the social and environmental dimensions.

6. Conclusion

This study has proved that the proper assessment of the economic efficiency of the farm requires a new approach and analyzing it as one of the alternative governance structures for agrarian transactions. Moreover, it has demonstrated that it is possible to make a comprehensive quantitative assessment of the level of governance efficiency of individual farms and farms of a different types. Furthermore, the suggested approach let not only "measure" the governance efficiency, but detect the critical micro-economic factors compromising it in different types of farms. Consequently, more realistic prospects of (juridical, size, specialization, geographical, etc.) restructuring and further development of Bulgarian farms have been presented. In addition, this approach could assist significantly improvement of farms' management strategies and public support interventions and has to supplement traditional analysis of production efficiency of farms of a different type.

The study has found out the governance, and thus the overall, efficiency of Bulgarian farms is at a good level with a significant variation in the efficiency of farms of different juridical types, sizes, specializations, geographical and ecological locations. The main factors leading to inferior governance efficiency of Bulgarian farms are quite specific but mostly associated with the low levels of efficiency for the organization of supply of necessary labor, innovations and know-how, and funding. Furthermore, a considerable proportion of the Bulgarian farms are with a low level of governance and overall efficiency, and most likely will cease to exist in the near future. The result of that assessment is different from dominating analysis in the area based solely on the "production function" approach and traditional indicators for the productivity of labor, land, and capital.

The presented and experimented "new" approach has to be further refined and incorporated into the assessment process of the real economic efficiency of the farms in general and of a different type. Such assessments, however, require a novel type of farming micro-economic data currently unavailable from traditional statistical and other sources. In the future, quantitative evaluations have to supplement more broadly dominating qualitative assessments in this important area, and use widely in academic studies and farm management practices. Besides, the evaluations of farms governance efficiency have to be made regularly to detect likely changes in the efficiency and longer-term dynamics. Hopefully, similar studies will appear in other countries as well and

allow more precise estimates of the comparative economic efficiency of farms on broader international scales.

Having in mind the big academic, policy, and farm management importance, the suggested framework has to be further improved and widely applied in the economic analysis at various levels. Adequacy and representatives of these kinds of assessments could be significantly improved, including internationally, if the "production-oriented" agro-statistical information system in the country and EU, was greatly modernized and included data about modes and factors of farming governance and transaction costs.

Section 3

Governance Dimensions of Farm Competitivenes

1. Introduction

The issues related to proper assessments of the competitiveness of agricultural farms in general and of different type and locations has been among the most topical for academicians, agro-business managers, interests-groups, administrators, politicians, international organizations, and public at large (Falciola & Rollo, 2020; Dresch *et al.,* 2018; Westeren, *et al.,* 2020; Wisenthige & Guoping, 2016). Furthermore, increasing the viability and competitiveness of agriculture and farms has been also identified as one of the strategic policy objectives of the EU in the current programming period of 2021-2027 CAP implementation (EU, 2018).

In other countries there have been multiple publications on the competitiveness of farms of different sizes (Alam *et al.,* 2020; Berti & Mulligan, 2016; Latruffe, 2010, 2013; Lundy, *et al.,* 2010; Mmari, 2015; Ngenoh *et al.,* 2019; Orłowska, 2019), agricultural industries and subsectors (Alam *et al.*, 2020; Benson, 2007; FAO, 2010; Jansik & Irz, 2015; Kleinhanss, 2020; Marques *et al.,* 2011; Marques, 2015; Nivievskyi, *et al.,* 2011; Ngenoh *et al.,* 2019; Oktariani, Daryanto, & Fahmi, 2016; Ziętara & Adamski, 2018), farming and agri-food-chain systems (Marques, 2015; Orłowska, 2019), regions (Marques *et al.,* 2011; Nowak, 2016; Lundy, *et al.,* 2010; Ngenoh *et al.,* 2019), organifactors for farm competitiveness enhancments (Berti & Mulligan, 2016; Mmari, 2015; Ngenoh *et al.,* 2019; Oktariani, Daryanto, & Fahmi, 2016; OECD, 2011), etc. Likewise, in Bulgaria, there have been numerous publications on levels and factors of farm competitiveness (Andonov, 2013; Alexiev, 2012; Borisov, 2007; Bashev, 2010, 2011, 2017; Ivanov *et al.,* 2020; Koteva & Bashev, 2010, 2021; Koteva, 2016; Koteva *et al.,* 2018; Slavova *et al.,* 2011; Bachev, 2010).

The competitiveness of farms is usually assessed through traditional indicators of technical and accountancy efficiency, the productivity of factors of production, the profitability of activity, farms' market position and shares, etc. and predominately based on macro (aggregate) statistical data. A systematic approach for defining competitiveness and formulating its pillars, principles, criteria, and indicators has been rarely implemented. What is more, the critical governance aspects of farm competitiveness, requiring first-hand farm micro-data, have been largely ignored by most of the assessment frameworks.

A novel comprehensive approach for assessing the competitiveness taking into account production, financial and governance aspects of farms ("competitive") potential was suggested, operationalized, experimented and gradually improved in the last decade (Башев и Котева, 2021; Башев Х. и др., 2022; Котева и Башев, 2011; Котева, 2016; Котева и др.,2021; Bachev 2010; Bachev, Ivanov, Sarov, 2020; Bachev & Koteva, 2021). In recent years, that new approach has been applied for the assessment of competitiveness levels of Bulgarian farms in general and farms with different specialization using both macro (agro-statistical) and micro (survey) economic data (Котева, Анастасова-Чопева, Башев, 2021; Башев Х. и др., 2022; Bachev & Koteva, 2021). The later evaluations have shown similar results and found that the overall competitiveness of Bulgarian farms is at a good level with great variations for holdings with different product specializations (Котева, Анастасова-Чопева, Башев, 2021; Bachev & Koteva, 2021). Furthermore, a significant share of all agricultural farms in the country are not competitive and most likely cease to exist in the near future.

There are no comprehensive assessments of the competitiveness of Bulgarian farms of different juridical types, economic sizes, and ecological and geographical locations at the current stage of development and EU CAP implementation. Neither there are studies for revealing the specific relations between the legal, operational, specialization, and territorial dimensions of farm competitiveness in the country.

The goal of this section is to fill the existing gap, incorporate a holistic multipillars framework, and assess the levels of and correlations between the competitiveness of Bulgarian farms of different juridical types, economic sizes, product specialization, and ecological and geographical locations.

2. Methods and data

In this study a comprehensive and holistic framework for assessing the competitiveness of Bulgarian farms is incorporated, presented and justified in detail in previous publications (Башев и др., 2022; Bachev & Koteva, 2021). According to the suggested more adequate understanding, the competitiveness of a farm means the capability (governance and production potential) of an agricultural holding to maintain sustainable competitive positions on (certain) market(s), leading to high economic performance through continuous improvement and adaptation to changing market, natural and institutional environment (Котева и др., 2021).

The main "pillars" of farm competitiveness are Economic efficiency (Production Pillar), Financial endowment (Financial Pillar), Adaptability and Sustainability (Governance Pillar) (Figure 3.1). Subsequently, Good competitiveness refers to the state in which a farm (1) produces and sells its products and services efficiently on the market, (2) manages its financing efficiently, (3) is adaptable to the constantly evolving market, institutional and natural environment, and (4) is sustainable in time. On the other hand, a low or lack of competitiveness means that the farm has serious problems in efficient financing, production and sale of products due to high production and/or transaction costs, inability to adapt to evolving environmental conditions and/or insufficient sustainability over time. For assessing the level of competitiveness of Bulgarian farms, a system of 4 criteria for each Pillar and 17 particular and 5 integral indicators are used (Figure 3.1).

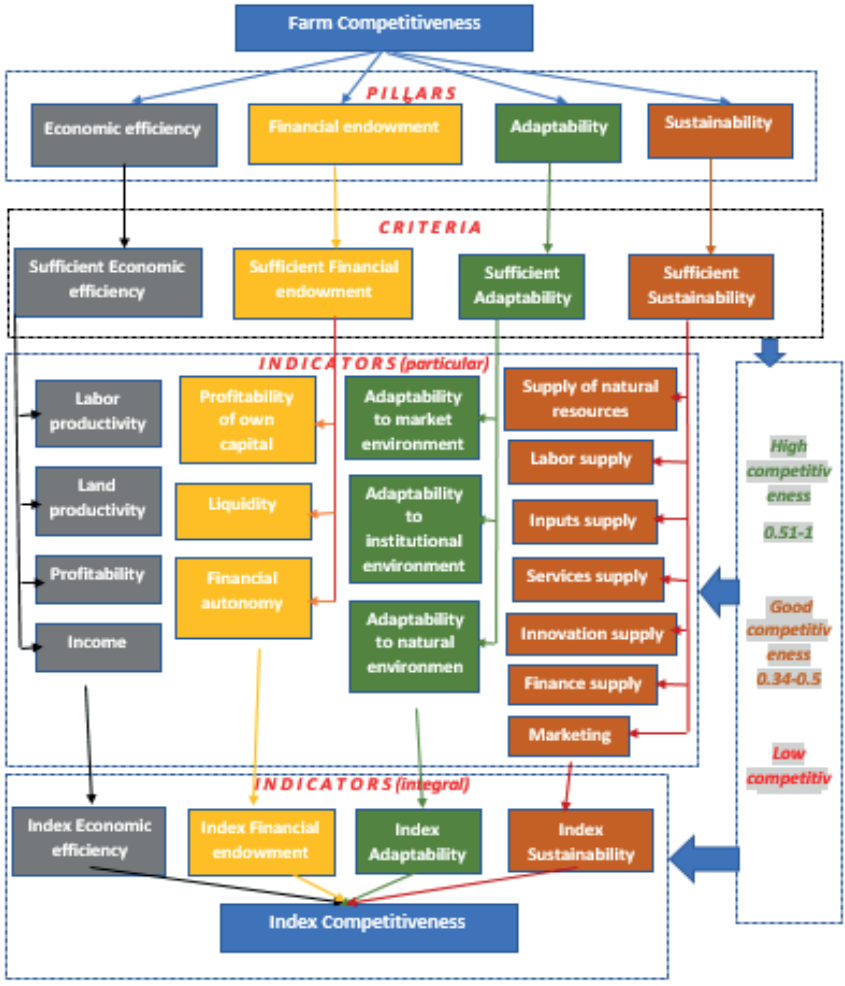

Figure 3.1. *Framework for Assessing Completeness of Bulgarian Farms*

Source: Authors

The assessment of the competitiveness level of Bulgarian farms is based on first-hand (survey) micro data collected in 2020 from the managers of 319 "typical" farms of different juridical types, economic sizes, production specializations, and ecological and geographical locations. The primary information was collected by the National Agricultural Advisory Service and major Agricultural Producers Organizations, and the structure of the surveyed farms approximately corresponds to the real structure of the farms in the country. A summary of the characteristics of surveyed agricultural holdings is presented in Table 3.1.

Table 3.1. *General characteristics of surveyed farms in Bulgaria (%)*

Juridical type, Economic size	**Share in total number, %**	**Ecological and Geographical region**	**Share in total number, %**
Physical Persons	94.30	Plain regions	58.31
Sole traders	2.22	Mountainous and Semi-mountainous regions	21.94
Cooperatives	0.63	With lands in protected areas	7.84
Corporations	2.22	Northwest region of country	17.87
Associations	0.63	North-central region of country	16.93
Mainly for subsistence	6.49	North-East region of country	16.61
Small size for the sector	61.69	Southwestern region of country	12.85
Average size for sector	29.87	South-central region of country	17.87
Big size for the sector	1.95	South-East region of country	17.87
Total number	319		100

Source: survey with agricultural producers, 2020.

During the survey, the farm managers were given possibilities to select one of the three levels (Low, Good, or High), which most closely corresponds to the condition of their holding for each indicator of the four competitiveness criteria. After that, the qualitative evaluations of the farm managers were transformed into quantitative values, as the High levels were valued 1, the Intermediate ones 0.5, and the Lows ones 0. Following that, for each of the surveyed farms, an Integral Competitiveness Index is calculated for individual criteria and as a whole, as arithmetic averages. The competitiveness indices of the farms with different types (legal status, size, region, product specialization, etc.) were calculated as an arithmetic average from the individual indices of the constituent farms in a particular group. For assessing the overall level of farm competitiveness, the following benchmarks, suggested by the leading experts in the area, are applied: High competitiveness level 0.51-1, Good competitiveness level 0.34-0.5, and Low competitiveness level 0-0.32.

3. Level of competitiveness of farms of different juridical type

There is considerable variation in the level of competitiveness of agricultural holdings of different legal types (Figure 3.2). With the highest competitiveness are cooperatives (0.64), and corporations and associations (0.53). The level of competitiveness of sole traders is good (0.44) and above the industry average (0.4). The lowest is the competitiveness of physical persons, which is at a good level (0.39), but below the industry average. This means that the current trend of transfer of agrarian resources and activity from the less competitive farms of physical persons to cooperative, corporate and firm management with higher competitive advantages will continue.

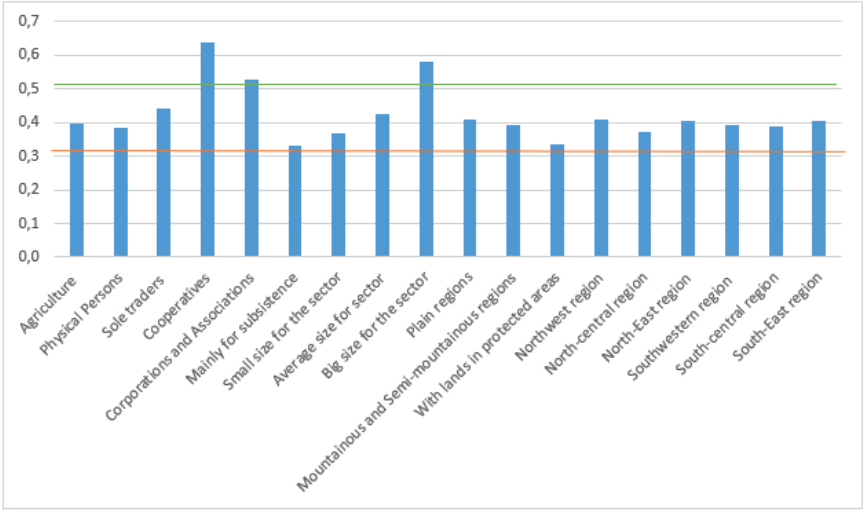

Figure 3.2. *Competitiveness of agricultural holdings of different types in Bulgaria*

Source: Authors' calculations.

All of the surveyed cooperatives, corporations and associations have a good or high level of competitiveness, including every cooperative farm (Figure 3.3). The share of sole trader with good and high competitiveness is also significant. At the same time, almost 37% of all physical persons have low competitiveness. Moreover, only 48.7% of physical persons have a level of competitiveness above the national average, and almost one in two with competitiveness below the average for the group of physical persons (Figure 3.4). Along with this, the share of cooperatives, corporations and associations, and sole traders with competitiveness above the idustry average is significant.

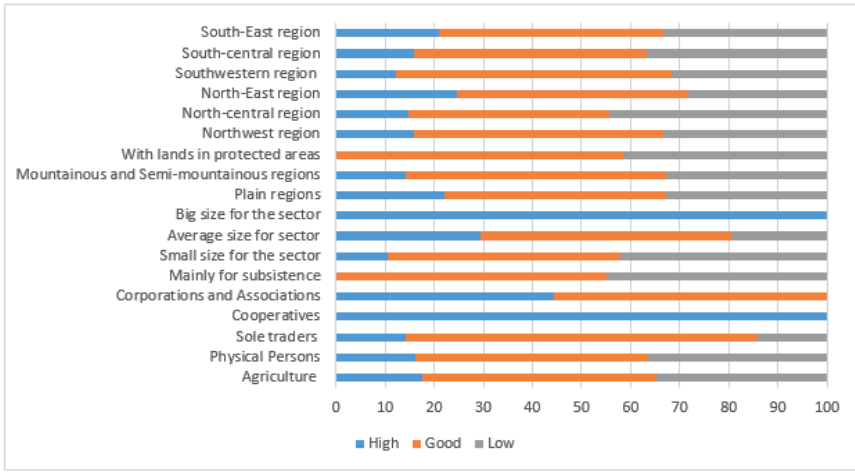

Figure 3.3. *Share of agricultural holdings with different levels of competitiveness in Bulgaria (%)*

Source: Authors' calculations.

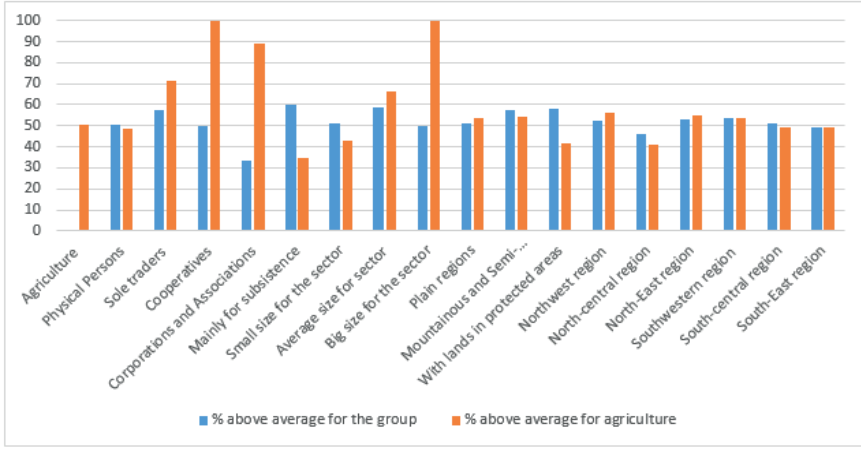

Figure 3.4. *Share of farms with a level of competitiveness above the average for the agriculture and the respective group in Bulgaria (%)*

Source: Authors' calculations.

This means that a significant part of the farms of physical persons will cease to exist in the near future, if measures are not taken in a due time to increase competitiveness by improving the management and restructuring of

farms, adequate state support, etc. as a result of weak competitive positions, bankruptcies, transformation into companies and partnerships, acquisition by more efficient structures, etc.

Two-thirds of corporations and associations also have below-average levels of competitiveness for this group, indicating a need for modernization to "align" with corporate governance and competition standards.

The analysis of the individual aspects of the competitiveness of farms with different legal types shows that (relatively) low economic efficiency to the greatest extent contributes to the deterioration of the competitiveness of physical persons and sole traders, the low financial security of physical persons, the low sustainability of cooperatives, and the low adaptability of corporations and associations (Figure 3.5).At the same time, high economic efficiency conditions the strong competitive positions of cooperatives, corporations and associations, and the high sustainability of sole traders.

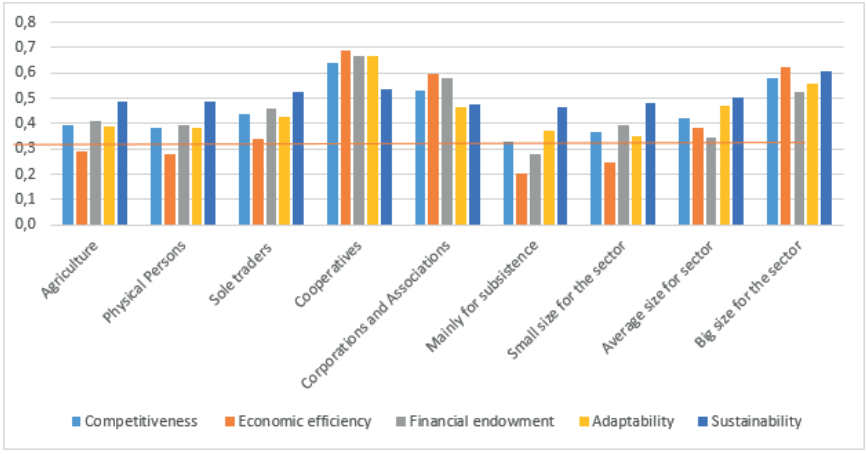

Figure 3.5. *Level of competitiveness of Bulgarian farms with different juridical types and sizes according to basic competitiveness criteria*

Source: Authors' calculations.

Cooperative and corporate farms have the highest financial security and potential for adaptation to changes in the market, institutional and natural environment, and cooperatives and sole traders have the highest sustainability. Good sustainability also contributes to the greatest extent to maintaining the competitiveness of physical persons in the country.

Most of the indicators of competitiveness of the farms of physical persons have values lower than the average for the country (Figure 3.6). In terms of adaptability to the natural environment, supply of land and natural resources, labor force, finance and services, the competitiveness of physical persons is like the sectoral average. Only in terms of supply of materials and equipment, these farms have competitive advantages compared to farms in the country.

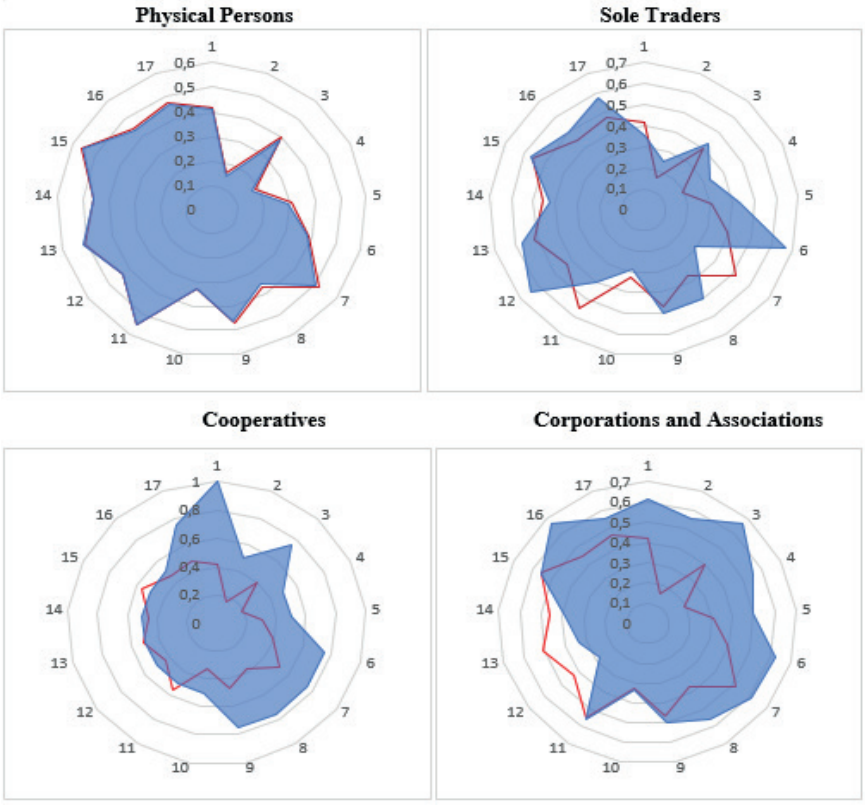

Figure 3.6. *Competitiveness indicators* of agricultural holdings of different juridical types in Bulgaria (red line – average for agriculture)*

* 1 – Labor Productivity; 2 -Land Productivity; 3 - Profitability; 4 - Income; 5 - Profitability of own capital; 6 – Liquidity; 7 - Financial autonomy; 8 - Adaptability to the market environment; 9 - Adaptability of the institutional environment; 10 - Adaptability of the natural environment; 11 - Supply of land and natural resources; 12 - Labor supply; 13 – Inputs supply; 14 – Finance supply; 15 – Services supply; 16 – Innovations supply; 17 – Utilization and marketing of produce and services

Source: Author‘s calculations.

The competitiveness of sole traders is supported by (better) good liquidity, profitability, and financial security, adaptability to the market and institutional environment, and advantages in terms of supply of services and innovations, and in the realization of production and services. Moreover, in terms of the supply of workforce and inputs, these holdings are superior to other legal types. The main factors for lowering the competitiveness of sole traders are relatively low productivity (0.25), productivity (0.36), financial autonomy (0.29), potential for adaptation to the natural environment (0.29), and weaker positions in supply of land and natural resources (0.4), and finance (0.43).

Cooperative farms have comparative competitive advantages over other legal types in terms of levels of productivity, profitability, liquidity, financial autonomy, adaptability to the market, institutional and natural environment, in the supply of labor and finance, and in the realization of production and services. Another significant part of the cooperatives' competitiveness indicators surpass the average for the country. To the greatest extent, greater problems in supplying the necessary land and natural resources (0.5) and services (0.5) contribute to lowering the competitiveness of cooperative farms.

Corporations and associations outperform other legal types with high levels of labpr and land productivity, and advantages in terms of supply of land and natural resource, and innovations. In addition, most of the remaining indicators of competitiveness of these farms are above the average for the country. Critical to maintaining the competitiveness of corporative farms are problems in supplying the necessary labor (0.28), materials and equipment (0.33) and finance (0.39), as well as average levels of adaptability to changes in the natural environment and efficiency in supplying the necessary services.

There is considerable variation in the competitiveness of farms depending on their product specialization (Figure 3.7). Deviations from the average for the legal type are largest for physical persons specialized in herbivores (-0.07), sole traders specializing in mixed crop production (-0.16), and corporations and associations specialized in herbivores (-0.15) and bees (+ 0.26). These deviations are towards the average level for the sub-sector for physical persons and corporations and associations specializing in herbivores. This shows that the production specialization of this group of farms is a more important factor for their competitiveness than their legal status.

On the other hand, for sole traders specialized in mixed crop production and for corporations and associations specializing in bees, the deviations are in opposite directions from the average levels for the sub-sector. This shows the additional comparative competitive advantages (of corporations and associations) or comparative competitive disadvantages (of sole traders) in certain sub-sectors of agriculture in the country – beekeeping and mixed crop production, respectively.

Finally, farms of physical persons dominate in the major types of production such as vegetables, flowers and mushrooms, herbivores, pigs, poultry and rabbits, mixed crop production and mixed livestock production. In these sub-sectors, the levels of competitiveness of physical persosns predetermine the sub-sector level, while at the same time matching or being close to the average for this legal type of holdings. This means that there is an "optimal" (competitive) specialization for this type of farming organization and there is practically no competition with other legal types in these industries.

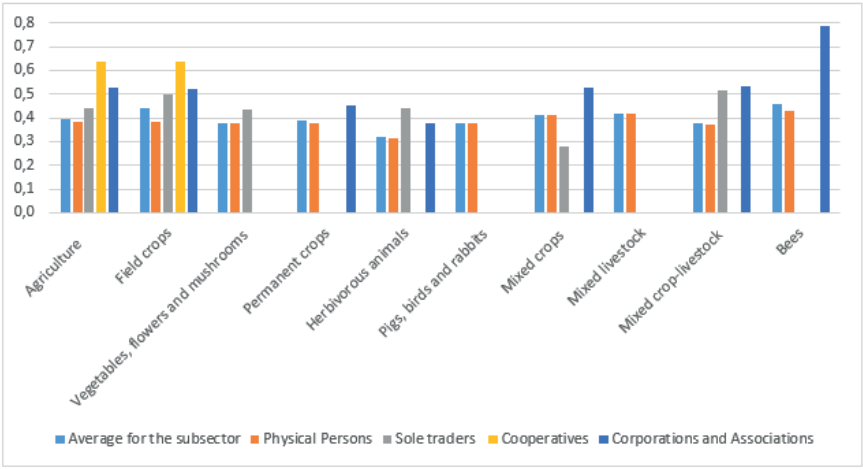

Figure 3.7. *Competitiveness of agricultural holdings of different legal type and specialization in Bulgaria*

Source: Authors' calculations.

It is to be expected that the restructuring of holdings of different legal type will continue, through the concentration of resources in the most efficient groups, diversification and/or change of specialization, transformation of the legal type of the farms, etc.

4. Level of competitiveness of farms of different sizes

There is also differentiation in the levels of competitiveness of farms of different sizes (Figure 3.2). There is a strong positive correlation between the size of the farm and its level of competitiveness. Farms with large sizes for the industry have the highest competitiveness (0.58). The level of competitiveness of medium-sized farms is good (0.42) and above the industry average. The level of competitiveness of small farms and subsistence farms is below the sector's average (0.37 and 0.33, respectively). This shows that the previous trend of transferring agrarian resources and activity from less competitive farms with small sizes and a semi-market orientation to those with medium and large sizes for the industry will be preserved.

All of the surveyed large-scale farms are highly competitive (Figure 3.3). The share of highly competitive medium-sized farms is also big. Along with this, however, a significant part of self-sufficiency farms and those with small sizes for the industry are of low competitiveness - respectively 45% and 42.1% of them. The share of medium-sized farms with an unsatisfactory level of competitiveness is also not small.

All of the large farms and two-thirds of the medium-sized ones have competitiveness levels above the industry average (Figure 3.4). Among self-sufficiency farms and those of small size, the share of those with competitiveness below the national average prevails. At the same time, however, the majority of semi-market holdings and medium-sized farms have levels of competitiveness exceeding that of the respective group - 60% and 58.9%, respectively. Among small and large-scale farms for the sector, the share of holdings with a higher competitiveness than the average for the group is half.

All this means that the restructuring of farms of all sizes will continue through the transfer of resources to more efficient structures in the relevant group and/or in groups with bigger sizes, consolidation of farms, improvement of management, suspension or reduction of activity, etc. Along with this, however, there will continue to be a significant number of farms with good and high competitiveness in farm groups of all sizes.

Low economic efficiency to the greatest extent contributes to the deterioration of the competitiveness of semi-market farms and small farms, the low financial security of all farms except the largest, and the lower sustainability and adaptability of smaller farms (Figure 3.5). At the same time, high economic efficiency, financial security, adaptability and sustainability are the reason for the strong competitive positions of large-scale farms.

All indicators of competitiveness of large farms, with the exception of supply of services, have values superior to the average for the country (Figure 3.8). The main areas that lower the (absolutely good) competitiveness of these farms are relatively low productivity, financial security, adaptability to the natural environment, and supply of labor and services.

The competitiveness of farms of average size for the industry is supported by best-in-industry adaptability to the natural environment and efficiency in the supply of services, and many other indicators superior to those of agriculture as a whole. Main factors for lowering the competitiveness of medium-sized farms are the lowest for the sector liquidity (0.1) and positions in terms of labor supply (0.4).

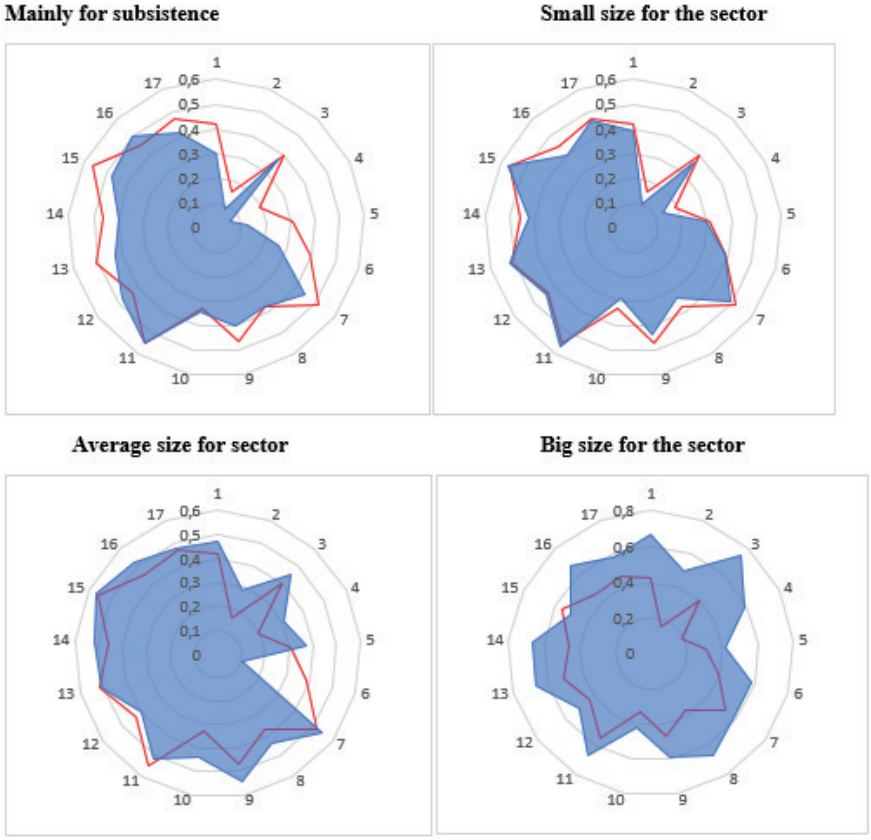

Figure 3.8. *Competitiveness indicators* of agricultural holdings of different sizes in Bulgaria (red line – average for agriculture)*

Source: Authors' calculations.

Small farms have comparative competitive advantages over industry averages only in terms of the supply of land and natural resources, labor, and inputs. Many of the indicators of competitiveness of these farms are below the average for the industry, and the most critical for the deterioration of their competitive positions are low productivity (0.11), profitability (0.13), adaptability to the natural environment (0.28), and financial security (0.3).

Most of the indicators of competitiveness of farms mainly for self-sufficiency are below average and/or among the lowest for the sector. Only in terms of adaptability to the natural environment and labor supply, this type of farm has levels superior to the industry average. Particularly critical for the competitiveness of these holdings are extremely low productivity (0.08), profitability (0.06), financial security (0.13), liquidity (0.26), and productivity (0.3).

There is considerable variation in the competitiveness of farms of different sizes depending on their product specialization (Figure 3.9). The level of competitiveness of large farms exceeds the sub-sectoral level in all types of specialization in which these farms operate. The situation is similar for most categories of medium-sized farms. Therefore, there are clear competitive advantages arising from the larger scale of operation - economies of scale and scope of production and transactional activity, potential for investment and innovation, etc.

In most categories of small farms, the levels of competitiveness are close to or coincide with the group and sub-sector averages. Exceptions are small farms with mixed livestock and those keeping bees, where the minimum size is a competitive advantage or disadvantage, respectively.

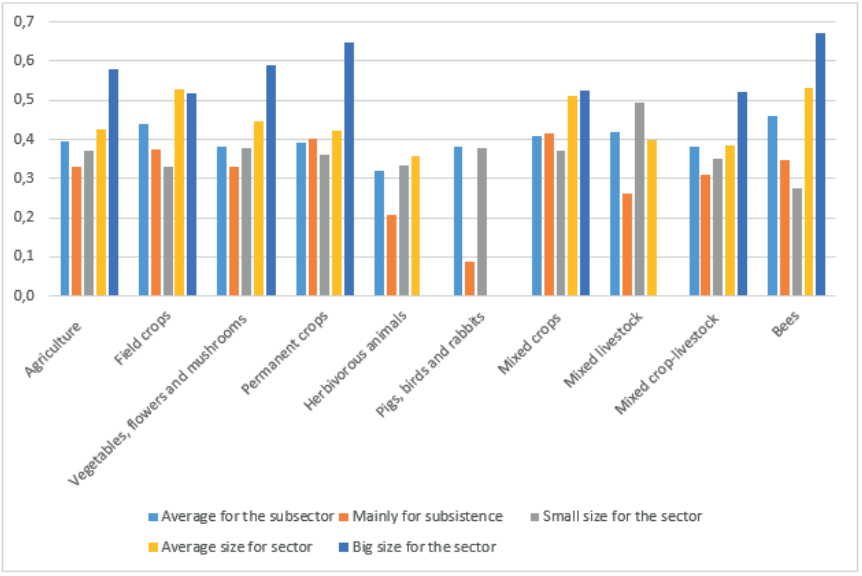

Figure 3.9. *Competitiveness of agricultural holdings of different sizes and specialization in Bulgaria*

Source: Authors' calculations.

Subsistence farms have a lower level of competitiveness than the average for the main sub-sectors and the farms with other sizes. The exception is the semi-market farms in permanent crops and mixed crop production, which have above average competitiveness for these sub-sectors and therefore comparative advantages over some groups of larger farms. Semi-market holdings specializing in herbivores, pigs, poultry and rabbits, and mixed livestock have strong competitive disadvantages compared to larger farms.

All these data show that the process of specialization and/or restructuring of farms will continue, depending on the competitive advantages or disadvantages caused by the respective size (small, medium, large) and nature (semi-market, market) of the activity in productions of different types and combination.

In the case of farms of physical persons and corporations and associations, there is a positive correlation between the level of competitiveness and the increase in the size of the activity (Figure 3.10). All of the surveyed sole traders are in the group of small farms and have a level of competitiveness exceeding both the average for this size group and the industry. The same applies to cooperatives, all of which are in the medium-sized group. Therefore, an optimal

size has been reached for realizing the maximum competitive positions of these legal types of holdings. The situation is similar with corporations and associations, which are divided into only two groups - small and medium in size. The competitive advantages of this form of economic organization are fully realized in small and/or medium sizes depending on production (specialization, etc.), management (need to coalition of resources, etc.), or other reasons.

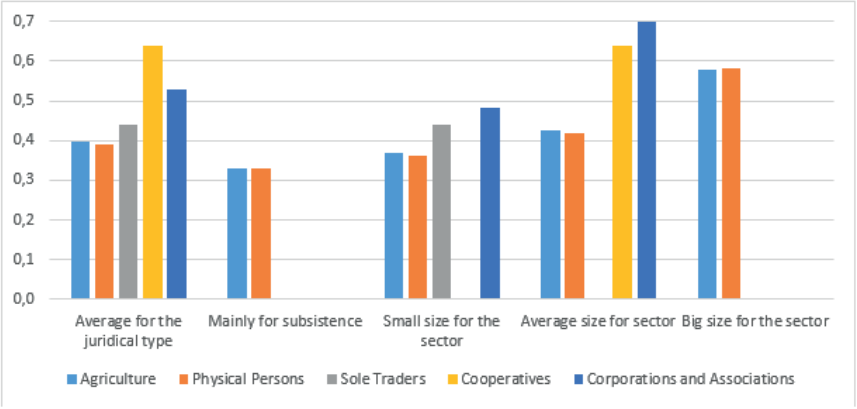

Figure 3.10. *Competitiveness of agricultural holdings of different sizes and juridical type in Bulgaria*

Source: Authors' calculations.

5. Level of competitiveness of farms with different ecological locations

There are also differences in the competitiveness of agricultural holdings in different ecological regions of the country (Figure 3.2). Farms in plain areas are more competitive than those in mountainous and semi-mountainous areas of the country. With the lowest absolute and comparative competitive positions are farms that operate with land in protected areas and territories. This requires long-term public support for this category of holdings to maintain their viability and the agricultural activity in such territories and zones.

The share of farms with good and high competitiveness in plains, and in mountainous and semi-mountainous regions is almost the same – about two-thirds of all farms (Figure 3.3). However, over 22% of all farms in plain areas are highly competitive, while among those in mountainous and semi-mountainous areas this share is significantly lower (14%). Nevertheless, almost every third farm in these areas is of low competitiveness and threatened

with extinction. Among farms with lands in protected areas and territories, there are no farms with high competitiveness, and the share of those with low competitive positions is almost 42%.

The share of farms with levels of competitiveness above the average for the sector and for the group in mountainous and semi-mountainous areas is higher than that of farms in plain areas (Figure 3.4). The highest is the segment of farms with better competitor positions for the territorial-ecological group in the protected zones and territories. In all ecological regions, however, there is a significant share of farms with higher competitiveness than the industry average and the group, and their activity is likely to be discontinued or transferred to farms with better competitive positions in the respective region.

In all aspects of competitiveness, the farms in the plain regions of the country are superior to those of the other ecological regions, and the most critical for their competitiveness is the low economic efficiency (Figure 3.11). In the mountainous and semi-mountainous regions, the competitiveness of holdings is similar to the average in the country in all aspects, as the most critical factor here is also the low economic efficiency. Farms with lands in protected zones and territories only have high values in terms of their sustainability, while according to the other criteria their competitiveness is at low levels.

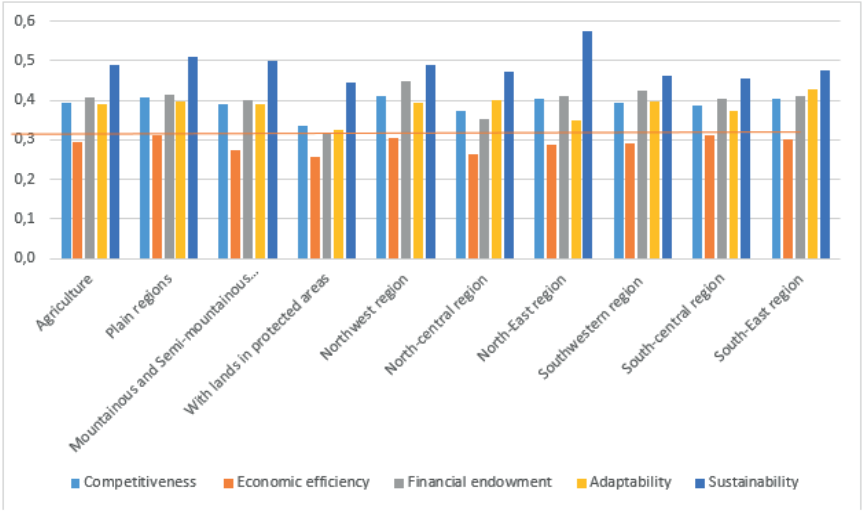

Figure 3.11. *Level of competitiveness of agricultural holdings with different ecological and geographical locations according to main competitiveness criteria in Bulgaria*

Source: Authors' calculations.

All indicators of competitiveness of farms in the plain areas are equal to or superior to the national average (Figure 3.12). To the greatest extent, maintaining and increasing the competitiveness of these farms contribute to high financial autonomy, efficiency in the supply of land and natural resources, services and innovations, and in the realization of production and services. The main areas that reduce the competitiveness of farms in plain regions are low productivity (0.17), profitability (0.12), and financial security (0.32).

Most indicators of the competitiveness of farms in the mountainous and semi-mountainous regions are close to the average for the country. Most important for the competitive positions of these farms are the high financial autonomy, and efficiency in the supply of land and natural resources, workforce, inputs, and services. Critical for the competitive positions of these farms are their low productivity (0.17), profitability (0.19), and financial security (0.3).

The majority of indicators for the competitiveness of farms with land in protected zones and territories are below the average for the country. Exceptions are low and equal to the industry profitability, and exceeding the national average efficiency in the supply of land and natural resources, inputs, and services. To the greatest extent, low levels of productivity (0.15), profitability (0.31), income (0.19), financial security (0.23), liquidity (0.3), and adaptability to the market (0.25) and the natural (0.29) environment contribute to lowering the competitiveness of these farms.

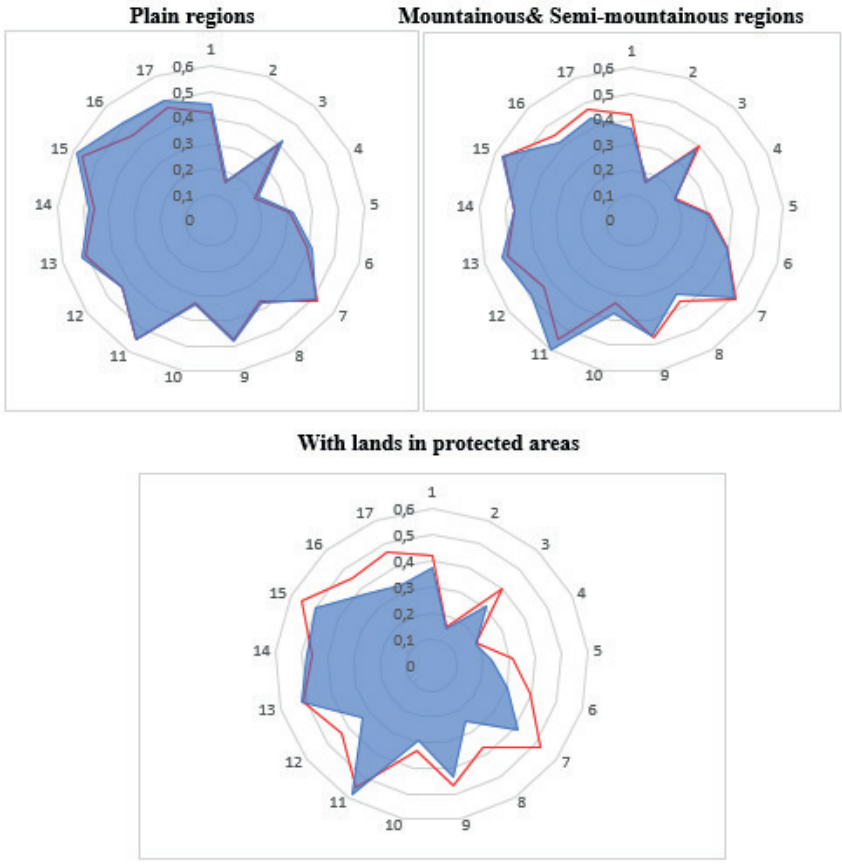

Figure 3.12. *Competitiveness indicators* of agricultural holdings with different ecological locations in Bulgaria (red line – average for agriculture)*

Source: Authors' calculations.

There are differences in the levels of competitiveness of farms with different specialization in individual ecological regions (Figure 3.13). Farms in the plains demonstrate significant competitive advantages over the rest of the country in field crops, perennials, mixed crop production, mixed livestock, mixed crop-livestock, and bees. Farms in mountainous and semi-mountainous areas are the most competitive among those specializing in vegetables, flowers and mushrooms, and those with lands in protected areas and territories in herbivores.

The level of competitiveness of specialized farms in plain areas exceeds that of other ecological areas in all areas except vegetables, flowers and

mushrooms, and herbivores. Farms operating in protected areas and territories have significant competitive disadvantages (much lower than sub-sectoral and regional competitiveness) in a number of key areas such as vegetables, flowers and mushrooms (0.24), perennial crops (0.3), pigs, poultry and rabbits (0.32), and mixed crop-livestock farming (0.3). In this ecological region, there are no holdings specialized in field crops due to low competitiveness, unacceptable efficiency, technological, institutional, etc. restrictions.

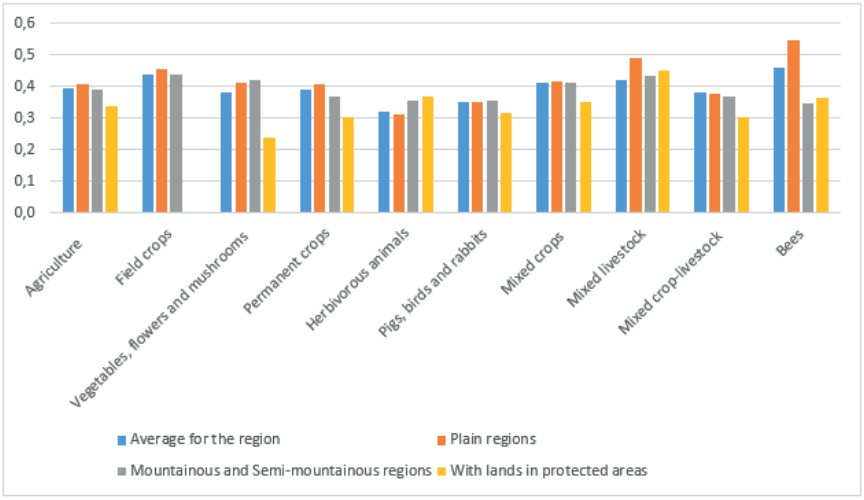

Figure 3.13. *Competitiveness of agricultural holdings in main ecological regions with different specialization in Bulgaria*

Source: Authors' calculations.

In the plain regions, farms with any legal status have a higher competitiveness than the rest of the country's regions, while preserving the differences reviled for the individual legal types (Figure 3.14). Only physical persons and corporations and associations operating in the protected zones and territories have the lowest competitiveness. This shows that the specific ecological location is an additional critical factor that benefits or impairs the competitiveness of farms in the country.

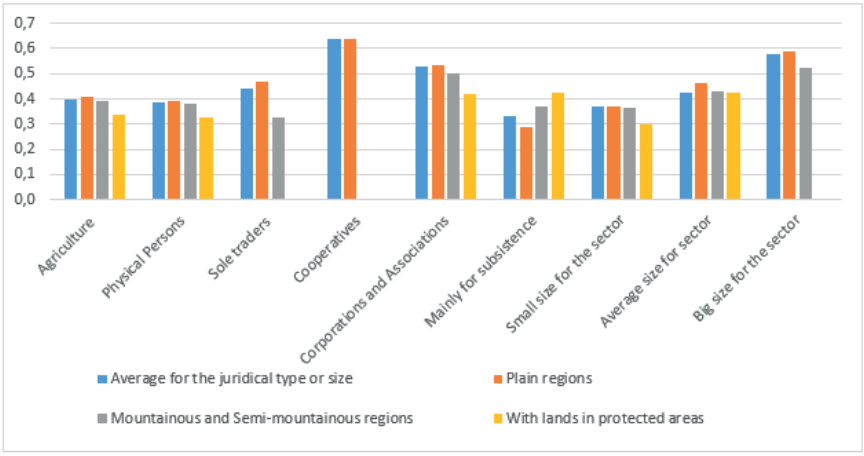

Figure 3.14. *Competitiveness of agricultural holdings in main ecological regions with different legal types and sizes in Bulgaria*

Source: Authors' calculations.

Semi-market farms located in protected areas and territories, and in mountainous and semi-mountainous areas have significant competitive advantages over those in plain areas (Figure 3.14). For all sizes of market farms, the plain layout provides an opportunity to realize higher competitiveness. Due to numerous restrictions and poor competitiveness, large-scale farms do not invest and operate in protected areas and territories.

6. Level of competitiveness of farms located in individual agrarian regions of the country

There are differences in the competitiveness of agricultural holdings in different agrarian regions of the country (Figure 3.2). The competitiveness of farms in the North-West and North-East regions is higher than the national average, while the farms in the North-Central Region, South-West, and South-Central Regions are lower than the industry.

The share of farms with good and high competitiveness in the North-East and South-East regions of the country is the largest - respectively every fifth and every fourth of them (Figure 3.3). The North-East and South-West regions have the smallest share of farms with low competitiveness. The largest number

of low-competitive farms are located in the North Central region – over 44% of the total number.

The largest number of farms with levels of competitiveness above the national average are in the North-West region, followed by the North-East and South-West regions (Figure 3.4). In all agrarian regions there is a significant number of farms with higher competitiveness than the average for the country and for the respective region. This means that the process of restructuring farms in all regions will continue through the transfer of management of activities and resources to farms from the same and/or other regions of the country.

In the individual agrarian regions, there is a significant differentiation of the levels according to the main criteria of competitiveness (Figure 3.11). Farms in the North-West region have the highest financial security and higher than most of the other regions (equal to the South Central region) economic efficiency. Farms in the North Central region have relatively high values in terms of adaptability and sustainability. Farms in the North-East region have the highest sustainability, but are with lower adaptability than other regions.

Farms in the South-West region have relatively better levels of financial security and adaptability, but with low sustainability for the sector. The farms in the South Central region have comparatively the highest levels of economic efficiency, but with lower levels than the other regions for the other competitiveness criteria. And finally, farms in the South-East region have the highest adaptability and close to the national average economic efficiency, financial security and sustainability.

High productivity, profitability, liquidity, financial autonomy, efficiency in the supply of land and natural resources, labor force, materials and equipment, services and innovations contribute the most to maintaining and increasing the competitiveness of farms in the North-West region (Figure 3.15). At the same time, their low productivity (0.13) and income (0.21) are critical for the competitiveness of farms in this region.

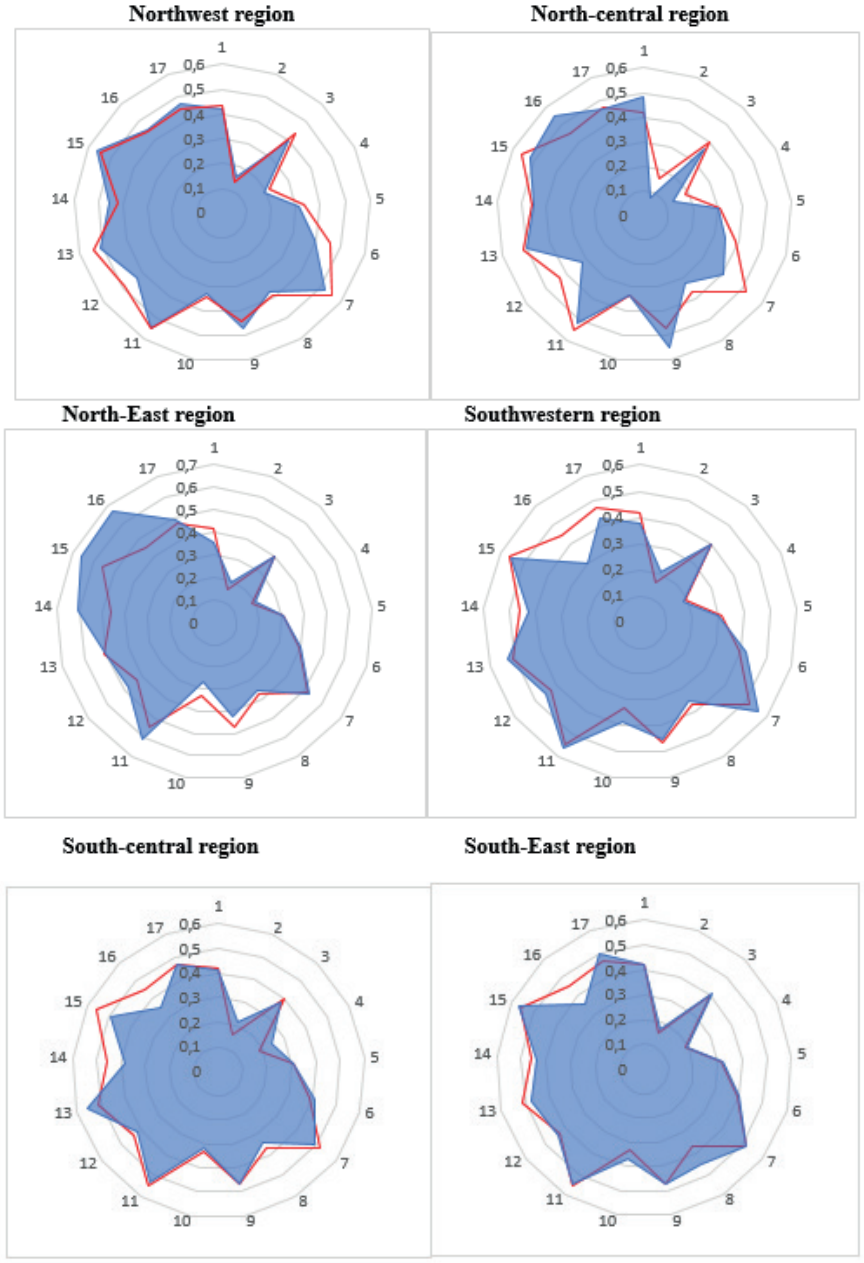

Figure 3.15. *Competitiveness indicators* of agricultural holdings located in different regions in Bulgaria (red line – average for agriculture)*

Source: Authors' calculations.

Farms in the North Central region have good competitive positions in terms of productivity, adaptability to the institutional environment, and high efficiency in the supply of land and natural resources, inputs, and innovations. Farms in this area, however, have very low indicators of productivity (0.08), income (0.13), and labor supply problems (0.31).

Farms in the North-East region have higher than the national average liquidity, financial autonomy, and efficiency in the supply of land and natural resources, workforce, finance, services and innovations, and better positions in the realization of production and services. Critical to the competitiveness of these farms are low productivity (0.19), income (0.2), financial security (0.31), and adaptability to the natural environment (0.26).

Farms located in the South-Western region of the country are superior to others in terms of liquidity, financial autonomy, and efficiency in the supply of land and natural resources, labor, and inputs. The most important areas that lower the competitiveness of farms in this region are low productivity (0.2), income (0.18), financial security (0.3), and efficiency in supplying innovations (0.3).

Most of the levels of indicators for the competitiveness of farms in the South Central region are lower and similar to the average for the country, and they have better meanings unity in terms of liquidity, efficiency in the supply of inputs, productivity and profitability. The most important factors worsening the competitiveness of farms in this area are low productivity (0.22), income (0.25), financial security (0.31), and adaptability to changes in the natural environment (0.32).

Farms in the South-East region have better than the national average productivity, profitability, income, financial security, adaptability to the market and natural environment, efficiency in the supply of labor force and services, and realization of production and services. Critical to improving the competitiveness of these farms are an increase in their productivity (0.18), income (0.2), financial security (0.32), and lower efficiency in supplying innovations (0.36).

The detailed analysis of the relationships of the level of competitiveness with the legal status, sizes, specialization and ecological location of the holdings in the different agrarian regions of the country did not establish specifics

different from those already established and described in the previous parts of the section.

7. Factors determining the competitiveness of agricultural holdings of different types

Significant factors for increasing competitiveness for all types of farms are: market conditions (demand and supply, prices, competition), received direct state subsidies, access to knowledge, consultations and advice, participation in state support programs, available information, financial opportunities, and the opportunities for benefits in the near future (Figure 3.16).

Furthermore, Opportunities for current benefits is a specific factor for the competitiveness of the majority of corporations and associations, subsistence farms and large-scale farms, and farms specializing in perennials, mixed cropping and crop-livestock farming, while Opportunities for benefits in a distant future for corporations and associations.

Private contracts and agreements are an important factor in the competitiveness of a large part of sole traders and cooperatives, and small-sized farms, while Available for implementing innovations for cooperatives, commercial companies and associations, and for medium and large farms in the sector.

The Existing problems and risks in the region and the country, and Regulatory documents, standards, norms, etc., the Control for compliance with laws, standards and rules, the State control and sanctions, the State policy and the Tax preferences are a critical factor for cooperatives, and the EU policies, and the Registration and certification of products, services, etc. for cooperatives and corporations and associations.

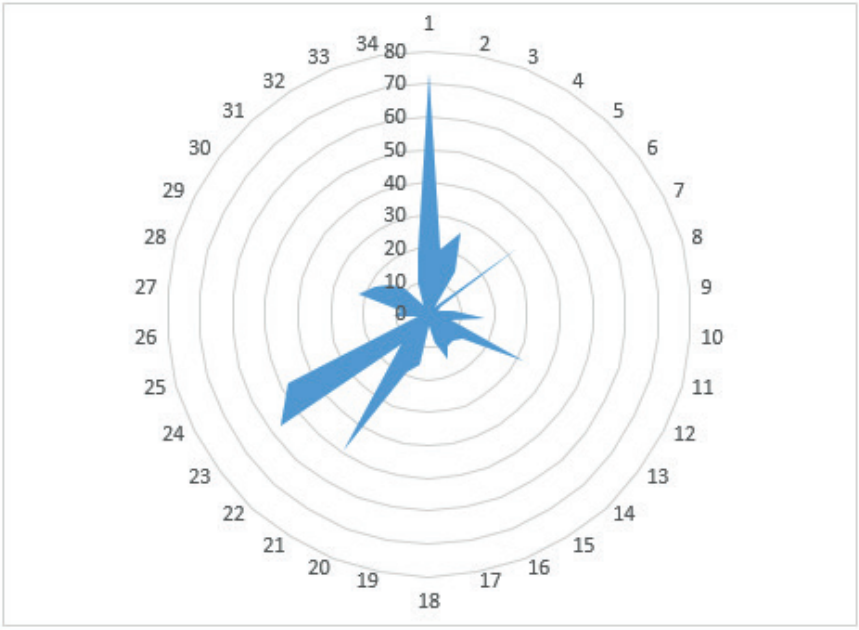

Figure 3.16. *Factors that contribute the most to increasing the competitiveness of agricultural holdings in Bulgaria* (%)*

*1- Market conditions (demand and supply, prices, competition); 2 - The opportunities for benefits for you at the present time; 3 - The possibilities of benefits for you in the near future; 4- The possibilities of benefits for you in the more distant future; 5- The immediate benefits for other persons and groups; 6 - The available information; 7 - Interest group initiatives and pressure; 8 - The initiatives and pressure of the community in the area; 9 - Availability of cooperation partners; 10 - Private contracts and agreements; 11 - The initiatives of other farms; 12 - Your financial capabilities; 13 - Innovations available for implementation; 14 - The existing problems and risks in the farm; 15 - Existing problems and risks in the region; 16 - Existing problems and risks in the country; 17 - Existing problems and risks on a global scale; 18 - The integration with the supplier of the farm; 19 - The integration with the buyer of the products; 20 - Your and employed workers professional training; 21 - Access to knowledge, consultations and advice; 22 - Regulatory documents, standards, norms, etc.; 23 - Received direct state subsidies; 24 - Participation in state support programs; 25 - The existence of a long-term contract with a state institution; 26 - Control of compliance with laws, standards and rules; 27 - State control and sanctions; 28 - State policy; 29 - The positive experience of

other farms; 30 - EU policies; 31- Registration and certification for products, services, etc.; 32 - The public recognition of your contribution; 33 - Tax preferences; 34 - Your personal conviction and satisfaction.

Source: survey with agricultural producers, 2020.

8. Conclusion

The multi-criteria assessment of the level of competitiveness of agricultural holdings in the country found that it is at a good level, but there is significant differentiation in the level and factors of competitiveness of holdings with different juridical types, sizes, product specialization, ecological and geographical location.

The low adaptive potential and economic efficiency to the greatest extent contribute to lowering the competitiveness of Bulgarian agricultural producers. Especially critical for maintaining the competitive positions of farms are the low productivity, income, financial security and adaptability to changes in the natural environment, in which directions the public support of farms and their management strategies for development should be directed.

A large ahare of farms of different types have a low level of competitiveness, and if measures are not taken in a due time to increase competitiveness by improving the management and restructuring of farms, adequate state support, etc., a large part of Bulgarian farms will cease to exist in the near future.

The suggested and successfully tested approach for assessing the competitiveness of farms should be improved and applied more widely and periodically. The precision and representativeness of the information used should also be increased by increasing the number of farms surveyed, which requires close cooperation with producer organizations, national agricultural advisory service, and other interested parties, and improving the system for collecting agro-statistical information in the country and the EU.

Section 4
Governing of Agririan Ecosystem Services

1. Introduction

Ecosystem services are products and other benefits that humans receive from natural ecosystems (MEA, 2005). That first comprehensive understanding of ecosystem services is generally well accepted presently as well (Maes *et al.,* 2021). The agricultural ecosystems and their specific "agro-ecosystem" services are widespread in Bulgaria, and worldwide (ИАОС; EEA; FAO). Since the introduction of this novel concept in the last years of the 20th century, (agro) ecosystem services have been intensively promoted, studied, mapped, evaluated, and managed (Adhikari *et al.* 2013; Allen *et al.* 2011; Boelee, 2013; De Groot *et al.* 2002; EEA, 2015; FAOi 2016; Fremier *et al.,* 2013; INRA, 2017; Gao *et al.,* 2018; Garbach *et al.,* 2014; Gemmill-Herren, 2018; Habib *et al.,* 2016; Kanianska, 2019; Lescourret et al., 2015; Laurans & Mermet, 2020; Marta-Pedroso *et al.,* 2018; MEA, 2005; Munang *et al.,* 2013; Nunes *et al.,* 2014; Novikova *et al.,* 2017; Petteri *et al.,* 2013; Power, 2010; Scholes *et al.,* 2013; Tsiafouli *et al.,* 2017; Van Oudenhoven, 2020; Wang *et al.,* 2013; Wood *et.al.,* 2015; Zhan, 2015).

However, despite growing environmental issues, and increasing public and private interests, the scientific studies in that new area are still a "work in progress". Research is commonly limited to a certain type of agro-ecosystem services (e.g. plant pollination, biodiversity conservation), a particular ecosystem (Stranja-Sakar mountain), a single aspect of the management (agronomic, technological), a specific form of governance (public support scheme, organic agriculture), a separate level of management (farming organization, geographical region), the specific type of costs and benefits (production, direct), etc. Furthermore, the importance of effective management ("good" governance) for conservation and sustainable provision of ecosystem services has been broadly recognized by the academic community, policymakers, interest groups, professional and business organizations, and the public at large (Bachev, 2018; EEA, 2015; FAO, 2016; UN, 2018).

In Bulgaria, research on economic and other issues related to agro-ecosystem services are at the beginning stage and mostly at "conceptual and methodological" level (Казакова; Недков; Николов; Тодорова; Bachev; Grigorova and Kazakova; ИАОС; Йорданов и др.; Чипев и др.). Besides, there very few studies on dominating modes of governance at the current stage of development and fundamental transformation of EU CAP (Башев; Башев и др. 2020; Todorova, 2017).

This section tries to fill the huge research and practical (policies and business) gap incorporating the interdisciplinary New Institutional Economics and: (1) suggests a more adequate definition of the governance of ecosystem services; (2) presents a holistic framework for identification, measurement and assessment of the mechanisms and modes of governance; (3) identifies the type, amount, and importance of various ecosystem services maintained and "produced" by the Bulgarian farms; and (4) identifies and assesses mechanisms, modes, efficiency and factors of diverse governance for ecosystem services in Bulgarian agriculture.

2. Methodology and data

By definition "agrarian" ecosystems and "agrarian" ecosystem services are those associated with the agricultural "production" - farming (Bachev, 2020). The hierarchical system of agro-ecosystems includes multiple levels (farm plot/section, area, micro-region, macro-region, etc.) while their (ecosystem) services are commonly classified into different categories - provisional, economic, recreational, aesthetic, cultural, educational, supporting, biodiversity conservation, water purification and retention, flood and fire protection, climate regulation, etc. (MEA, 2005; Maes *et al.,* 2021). While there is a general consensus on the meaning of agro-ecosystem services, still there is no broadly accepted view on the understanding and content of their governance (Bachev, 2020).

The "governance" is a newly evolving popular concept for researchers, policy-makers, corporate managers, interests' groups, international organizations and alike (Adhikari *et al.* 2013, Allen *et al.* 2011, Boelee 2013, EEA 2015, FAO 2016, Habib *et al.* 2016, Laurans & Mermet 2014, Lescourret *et al.* 2015, Tsiafouli *et al.* 2017, UN 2005, Van Oudenhoven 2020, Wang *et al.* 2013). However, there is not a common understanding of the content and approach to study this new phenomenon. It is either associated and/or identified with the governing agents (individuals and bodies), or the type of Government (centralized, democ-

ratic, etc.), or restricted public form(s) (domination of "rule of Law", involvements of civil society, etc.) or formal (corporate, cooperative, etc.) forms, or certain social "tools" (public programs, contracts, etc.), or a particular type of (a "good", efficient, democratic, etc.) governance, a certain aspects (system, process, outcome) of governance, or to diverse governing structures 9markets, hierhies, contracts), or extended to all rules, mechanisms and modes "managing" human behavior and actions (institutions, market, private, etc.).

In this study, we incorporate interdisciplinary New Institutional Economics framework (Bachev, 2009; Furuboth and Richter; Ostrom; North; Williamson) and a broader view of the governance is taken. The governance is understood holistically (Bachev, 2021) as:

(1) the governing agents; and

(2) the system of rules, mechanisms and forms put in place that "govern" agents' behavior, action and relations; and

(3) the "process of governing"; and

(4) the "outcome of the process" (the state of specific system of social order).

The governance system comprises of all formal and informal rules, mechanisms and modes, and associated agents (individuals, organizations, agencies, etc.). In the specific natural, market, institutional etc. environment individual agents tend to select and use that form of governance that optimize their production and transaction costs (Bachev, 2020). Nevertheless, the "outcome" of that private and market governance is not always maximum volume of (agro) ecosystem services – market, private, contracts, etc. failures are frequent and often dominate. There is a strong need for public intervention in sustainable production and maintenance of (agro)ecosystem services. However, public "failures" are also possible and often widespread. Detailed presentation of the New Institutional Economics framework for studying and evaluating generic modes of governance, and the comparative advantages and disadvantages of individual forms used for ecosystem services management in Bulgarian agriculture is done in other publications of the author (Bachev 2009a, 2009b, 2010, 2020).

The individual farm is the main organizational unit in agriculture that manages resources, technologies and activities, and produces a variety of products, including the positive and negative services of agro-ecosystems (Bachev 2009, 2021). The governance of agro-ecosystem services is an integral part of the management of agricultural farm, and the farm is the first (lowest) level

for agro-ecosystem services governance (the farm borders rarely coincide with the (agro) ecosystem boundaries). Thus, the system of governance of agro-ecosystem services always includes the farm as a key element (1st level) of management of agro-ecosystems and their services (Figure 4.1).

Other agrarian and not agrarian agents (resource owners, inputs suppliers, wholesale buyers and processors, interests' groups, policymakers, local and national authorities, residence and visitors of rural areas, final consumers, international organizations, etc.) also take part in the management of agro-ecosystem services at farms, regional, sectoral, national and international levels (Bachev 2020). Vertically, the governance of the agro-ecosystem services is (has to be) done in multiple levels – sectoral, regional, national, European Union, transnational, global. Unlike governance of "pure" agricultural activities (where "simple" private and market mechanisms work considerably well), the effective governance of agro-ecosystem services activities often requires complex, multilateral, and trilateral forms, and multi-level governance.

The system of governance of agro-ecosystem services includes several principle mechanisms and forms that "manage" the behavior and activity of individual agents and ultimately determine the level of agro-ecosystem services (Figure 4.1):

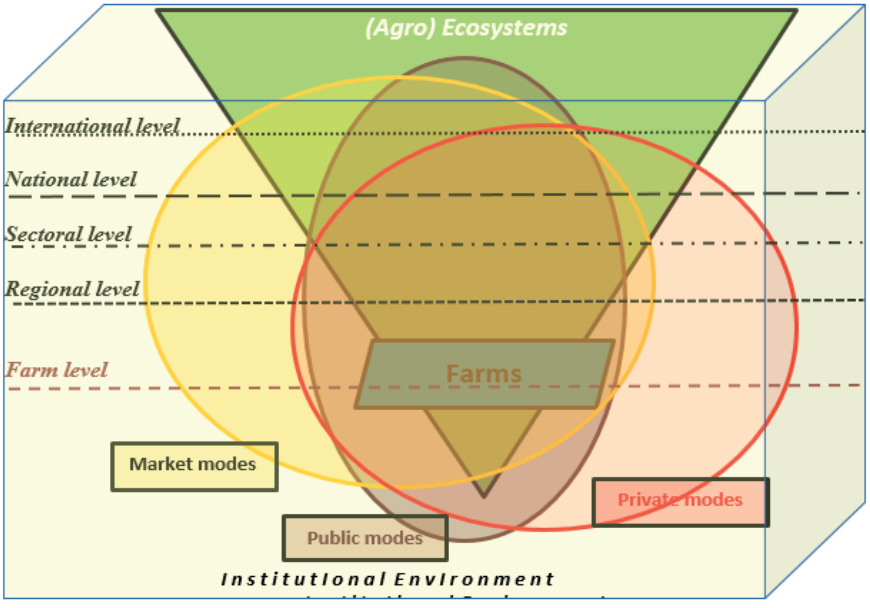

Figure 4.1. *Levels and Modes of Governance of Agroecosystem Services*

Source: Authors

First, institutional environment ("rules of the game") – that is the distribution of rights and obligations between individuals, groups and generations, and the system of enforcement of these rights and rules (Furuboth and Richter; North). The spectrum of rights may include tangible and intangible assets, natural resources, activities, clean nature, food and eco-security, internal and inter-generational justice, etc. Enforcement of rights and rules is done by the state, social pressure, trust, reputation, private forms, or self-sanctioned by agents. Some of the rights and rules are determined by formal laws, regulations, standards, court decisions, etc. There are also important informal rules and rights established by tradition, culture, religion, ideology, ethical and moral norms, etc. Modern development is characterized by the constant expansion of various eco-rights and obligations, including the granting of welfare rights to animals, wild plants and animals, and to entire ecosystems.

Second, market forms ("the invisible hand of the market") - a variety of decentralized initiatives driven by the movement of "free" market prices and market competition such as: spotlight exchange of eco-products and services, classical contract for purchase, rent or sale, production and trade with special high quality, organic, etc. products and origins, ecosystem services, etc.

Third, private forms ("private or collective order") - various private initiatives and special contractual and organizational forms such as: long-term eco-contracts, voluntary eco-actions, voluntary or mandatory codes of eco-behavior, partnerships, eco-cooperatives and associations, trademarks, labels, etc.

Fourth, public forms ("public policy intervention") - various public (community, state, international) involvments in the market and private sectors such as: public recommendations, regulations, support, taxation, financing, provision, modernization of rights and rules, etc.

Fifth, hybrid forms - some combination of the above three, such as public-private partnerships, public licensing and inspection of private bio-farms, etc.

The efficiency of the individual forms of governance of agro-ecosystem services of different types is quite different since they have unequal potential to: provide adequate eco-information, induce positive eco-behavior, resolve eco-conflicts and coordinate eco-activities of different participants, improve environmental sustainability and reduce eco-risks, minimize overall eco-ma-

nagement costs (for conservation, third party, transaction, etc.), for agents with different preferences and opportunities, and in specific (socio-economic, natural) conditions of each eco-system, community, industry, region, and country. Depending on the efficiency of the established system of governance of agro-ecosystem services, individual farms, sub-sectors, regions and countries achieve different results in the conservation, restoration and improvement of ecosystems, and there is a different state of natural resources, level of eco-risks and eco-costs related to the development of agricultural sector, and unequal environmental sustainability of individual farms, sub-sectors, regions, agriculture, and different countries.

Farmers use diverse mechanisms and modes to manage their activity and relations with other agents (Bachev 2010, Williamson 1996): internal (direct production management, own conviction of farm manager/owner, building reputation, etc.), market (free-market price movements, competition, etc.), contract (special or interlinked contracts, etc.), collective (cooperation, joint initiatives, etc.), public (public eco-contract, cross-compliance against EU subsidization, etc.).

In Bulgaria, there are statistical and other data for the type of agro-ecosystem service provided by farms and the specific forms of management applied in agrarian sector. Therefore, a numebr of approaches have been used to identify the varieties of modes and mechanisms used to govern agro-ecosystem services in the country – literature review, official reports of governmental and non governmental organizations, expert assessments etc. In addition, a survey with the managers of 324 “typical” farms of different legal type, size, production specialization, and ecological and geographical location was conducted in October 2020 with the assistance of National Agricultural Advisory Service and major producers organizations in the country, to identify the structure of ecosystem services “produced” and governing modes employed. Initially, a literature review and widespread practices examination has been made to prepare the list of diverse types of agro-ecosystem services maintained or provided as well as major forms of governance used by the farms. The questionnaire also gives an option to respondents to add specific services provided and managerial forms practiced.

Surveyed farms account for almost 0,5% of all registered agricultural producers in the country. The structure of studied holdings approximately corresponds to the real structure of farms in Bulgaria. The classification of

agricultural holdings has been done according to official classification in the country and EU. The subsectors, regional, national, etc. summaries are arithmetic averages of data provided by the individual farms belonging to respective agro-systems.

Since the individual farm is the basic unit of management of agrarian activities and provision of agro-ecosystem services, the study has used only farming data while the agroecosystem services at a higher lever have been evaluated as sum of ecosystem services provided by the farms associated with the relevant (agro)ecosystems. Consequently, there is an unavoidable error from multiple accounting and/or calculated trade offs, synergies, complementarities and controversies of analyzed agro-ecosystem services of different type. Nevertheless, the assessments of the farm managers about type, amount, and importance of agro-ecosystem services they maintain or produce give good insights on the state and efficiency of agro-ecosystem services in the country. The asymmetry of information is quite big in the area and farmers are among the most informed actors about agricultural efforts and contribution toward (agro)ecosystem services. However, the managers estimate also reflects the "personal" (subjective) knowledge and perceptions of the farmers on agro-ecosystem services and their values, the efforts rather than the (entire) output and impacts, etc. The objectivity of assessments would have enhanced during the further studies in the area when farms representations will be increased and assessments complemented ("corrected") with estimates of stakeholders, consumers, experts, etc. at different levels of governance.

3. Type and amount of ecosystem services of Bulgarian farms

The conducted survey allowed to make identification and detailed map of the agro-ecosystem services of different types provided by agricultural producers, as well as to determine the structure and volume of the services of the agro-ecosystems of various types. The share of farms involved in activities related to the provision of agro-ecosystem service of a certain kind gives a good idea of the volume of "produced" service of that type. The majority of Bulgarian farms participate in the "Production of products (fruits, vegetables, flowers, etc.) for direct human consumption", which is one of the main "services" of agro-ecosystems in the country (Figure 4.2). A significant part of the farms also "Produce raw materials (fruits, milk, etc.) for the food industry".

Other "production" services in which a smaller part of the farms participate are "Production of animal feed", "Own processing of agricultural products", "Production of seeds, saplings, animals, etc. for farms", and "Production of raw materials for cosmetic, textile, energy, etc. industry". Other "production" services of agroecosystems, in which a relatively small part of agricultural producers participate, are "Provision of services to other farms and agricultural organizations", "Provision of services to end users (riding, fruit picking, etc.)", "Provision of tourist and restaurant services", and "Production of bio, wind, solar, etc. energy". Other important services of the agro-ecosystems, in which "supply" a large part of the agricultural holdings participate, are "Hiring workers", and "Providing free access on the farm to outsiders".

Relatively many of the farms are also involved in the protection and preservation of technological, biological, cultural and other heritage - "Preservation of traditional crops and plant varieties", "Preservation of traditional species and breeds of animals", "Preservation of traditional methods, technologies and crafts", "Preservation of traditional products", "Preservation of traditional services", "Preservation of traditions and customs", and "Preservation of historical heritage". A major part of agro-ecosystem services consists in preserving, restoring and improving the elements of the natural environment - soil, water, air, gene pool, landscape, plants and animals, etc. The activity of a large part of the agricultural holdings is aimed at the production of this type of agro-ecosystem services - "Disease control (measures)", "Pest control (measures)", "Protection of natural biodiversity", "Protection and improvement of soil fertility", "Protection from soil erosion", "Protection and improvement of soil purity", "Protection of surface water", "Protection of groundwater purity", "Fire protection (measures)", and "Protection of plant and/or animal gene pool". A relatively smaller part of the farms are also included in "(Measures for) water conservation and saving", "(Measures for) regulation of the correct outflow of water", "Preservation of air quality", "Preservation of traditional scenery and landscape", "Improvement (aesthetics, aroma, land use, etc.) of scenery and landscape", "(Measures for) regulation and improvement of the microclimate", "Flood protection (measures)", and "Greenhouse gas emission reduction (measures)", and "(Measures) for storm protection". One of the essential services of agro-ecosystems is the recovery and recycling of "waste" from various activities in the sector and other industries. The main activity of many farms in this regard is "Use of manure on the farm", and to a lesser

extent “Reuse and recycling of waste, composting, etc.”, and “Use of sludge from water treatment on-farm”.

Agro-ecosystems also make a significant contribution to training farmers and non-agricultural agents, conducting scientific experiments, demonstrating innovation, and so on. In such educational, scientific and innovative services participate a smaller part of the agricultural producers - “Training and advice of other farmers”, “Training of students, consumers, etc.”, “Demonstration of production, technologies, innovations, etc.” and “Conducting a scientific experiment”. Agro-ecosystems also contribute to the “Protection and improvement of non-agricultural (forest, lake, urban, etc.) ecosystems” with 4.32% of farms in the country engaged in such efforts.

The extent of participation of supplying farms in the presevation or production of agro-ecosystem services is not equal. For most agri-ecosystem services, the holdings involved in the activities do so “To a large extent’ (Figure 4.2). Therefore, “permanent” investments in agri-ecosystem services and “specialization” in the provision of agro-ecosystem services of a certain type to participating farms can be considered. In some agro-ecosystem services, the share of farms involved to a large and small extent is equal - for example in the use of manure on the farm, the provision of services to other farms and agricultural organizations, (flood protection) measures, and the hiring of workers. Therefore, a significant proportion of farms are either in the process of initially “entering” (testing, studying, adapting, etc.) in the related agro-ecosystem services, or participate in this supply as ancillary or related to the main activity. With regard to three main types of agro-subsistence services, most of the farms involved in their supply do so to a small extent – on farm using sludge from water treatment, training of students, consumers, etc., and use and recycling of waste, composting, etc. This is a sign of either the initial entry into or exit from this activity, or the inefficiency of its further expansion (intensification) by practicing farms.

The unequal participation of farmers in the provision of agro-ecosystem services of different types and unlike degrees of involvement in such activities shows the need to take measures to improve, diversify and intensify this activity through training, information, exchange of experience, public incentives, etc.

Figure 4.2. *Share of farms participating in and providing to a big extent diverse ecosystem services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

There are significant differences and deviations from the average level in the participation of agricultural holdings in the preservation and supply of agro-ecosystem services in the main geographical and agricultural regions, in different subsectors, in farms of various sizes, and in diverse ecosystems of the country. For instance, a good illustration of that variation is done in Figure 4.3 with a key agro-ecosystem services of Bulgarian farms such as "Conservation of natural biodiversity" (Figure 4.3).

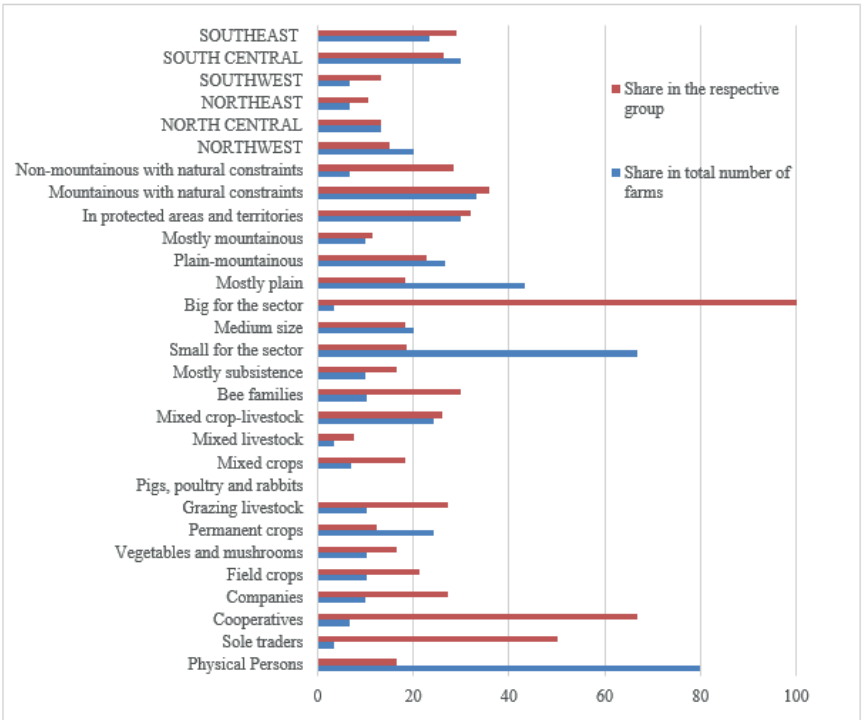

Figure 4.3. *Share of farms of different type and ecosystems that participate in "Conservation of natural biodiversity" in total number of Bulgarian farms and in different groups (percentages)*

Source: Survey of agricultural producers, 2020

There are significant deviations from the average level in the participation of farms in the preservation and supply of agro-ecosystem services in the main geographical and agricultural regions of the country. North-western region surpasses the other regions in terms of share of farms contributing to agro-ecosystem services for production of raw materials for the food industry (17.5%), own processing of agricultural products (12.5%), provision of tourist and restaurant services (2.5%), provision of services to end-users (5%), and protection and improvement of soil fertility (22.5%). The North Central region is a champion in terms of farm participation in the preservation of traditional crops and plant varieties (16.7%), preservation of traditional methods, technologies and crafts (10%), preservation of traditional products (10%), (measures for) fire protection (13.3%) and protection of plant and /or animal gene pool

(13.33%). The Northeast region is the largest supplier of the following agro-ecosystem services - production of animal feed (15.8%), production of seeds, saplings, animals, etc. for farms (10.5%), production of raw materials for cosmetics, etc. industries (15.8%), production of bio, wind, solar, etc. energy (5.3%), (measures for) pest control (42.1%), (measures for) disease control (47.4%), conducting a scientific experiment (5.3%), providing free access on the farm to outsiders (15.8%) and hiring workers (21.1%).

Southwestern region has a leading position only in terms of three agro-ecosystem services - production of animal feed (13.3%), provision of services to other farms and agricultural organizations (6.7%) and conservation of traditional species and breeds of animals (13.3%). South Central region is the largest producer of many agro-ecosystem services - production of products for direct use by human (82.3%), use of manure on the farm (23.5%), preservation of traditional species and breeds of animals (14.7%), preservation of traditional methods, technologies and crafts (11.8%), preservation of traditional services (14.7%), preservation of traditional scinery and landscape (11.8%), improvement of scinery and landscape (8.8%), preservation of tradition and customs (8.8%), training and advice of other farmers (11.8%), training of students, consumers, etc. (8.8%), demonstration of productions, technologies, innovations, etc. (2.9%), protection of natural biodiversity (26.5%), protection against soil erosion (29.4%), protection and improvement of soil fertility (26.5%), protection and improvement of soil purity (20.6%), protection of purity of surface waters (20.6%), protection of groundwater purity 17.6%, (measures for) conservation and savings of water (14.7%), protection of air purity (11.8%), (measures for) reduction of greenhouse gas emissions (8.8%), (measures for) pest control (23.5%), (measures for) control of diseases (35.3%), (measures for) regulation and improvement of the microclimate (11.76%), (measures for) protection against storms (8.8%), use and recycling of waste, composting, etc. (14.7%), conducting a scientific experiment (5.9%), protection of plant and / or animal gene pool (11.8%), protection and improvement of non-agricultural ecosystems (8.8%) and employment of workers (20.6%). Southeast region is a leader in terms of production of products for direct human consumption (66.7%), protection of natural biodiversity (29.2%), protection against soil erosion (25%), (measures to) regulate the proper outflow of water (8.33 %) and fire protection (measures) (12.5%).

The large specific ecosystems in the country also differ significantly in the structure of the dominant agro-ecosystem services and in the share of the farms

involved in their preservation and provision. For example, the agro-ecosystem Western Stara Planina is a leader in the share of farms engaged in agro-ecosystem services related to the production of animal feed (11.5%), own processing of agricultural products (15.4%), provision of services to other farms and agricultural organizations (3.8%) and provision of services to end users (7.7%). Another studied mountenous agro-ecosystem the Rhodope Mountains is leading in the share of agricultural producers involved in the production of products for direct human consumption (78.9%), production of raw materials for the food industry (21.1%), use of manure on the farm (26.3%), preservation of traditional species and breeds of animals (10.5%), preservation of traditional methods, technologies and crafts (10.5%), preservation of traditional services (21.1%), preservation of traditional scinery and landscape (10.5%), improvement of scinery and landscape (5.3%), preservation of historical heritage (5.3%), education of students, consumers, etc. (5.3%), protection of natural biodiversity (26.3%), protection from soil erosion (31.6%), protection and improvement of soil fertility (26.3%), protection of air purity (10.5%), (measures of) reduction of greenhouse gas emissions (5.3%), (measures for) regulation and improvement of the microclimate (15.8%), use and recycling of waste, composting, etc. (10.5%), protection of plant and /or animal gene pool (15.8%), and protection and improvement of non-agricultural ecosystems (5.3%).

Agri-ecosystem Danube Plain occupies leading positions in terms of the share of farms involved in the production of raw materials for the food industry (26.9%), provision of services to other farms and agricultural organizations (3.8%), preservation of traditional crops and plant varieties (7.7%), preservation of traditional species and breeds of animals (11.54%), preservation of traditional methods, technologies and crafts (11.5%), preservation of traditional products (11.5%), preservation of traditions and customs (7.7%), demonstration of productions, technologies, innovations, etc. (3.8%), protection and improvement of soil purity (19.2%), protection of groundwater purity (23.1%), (measures for) storage and saving of water (15.4%), (measures for) fire protection (15.4%), protection of plant and /or animal gene pool (15.4%), free access on the farm to outsiders (19.2%) and hiring of workers (11.5%).

The agro-ecosystem of Dobrudja surpasses the others in terms of production of seeds, saplings, animals, etc. for farms (5.5%), production of raw materials for cosmetics and other industries (5.5%), flood protection (measures) (5.5%), fire protection (measures) (16.7%), pests control (measures) (50%), (measures for) disease control (55.6%), conducting a scientific experi-

ment (5.6%), free access on the farm to outsiders (16.7%) and protection and improvement of non-agricultural ecosystems (5.6 %). The Thracian Lowland agro-ecosystem is at the forefront in terms of the share of participating farms in the production of products for direct human consumption (80%), on-farm use of sludge from water treatment (4%), conservation of natural biodiversity (28%), conservation of surface water purity (20%), storm protection (measures) (4%) and employment of workers (12%).

Farmers in the principle ecosystems of the country are also involved to varying degrees in the preservation and production of agro-ecosystem services. Agro-ecosystems in a predominantly plain region of the country are leading in the number of participating farmers in terms of production of products for direct human consumption (63.4%), provision of services to other farms / agricultural organizations (4.2%), protection from soil erosion (15.5%), protection and improvement of soil fertility (18.3%), (measures for) pest control (26.8%) and (measures for) disease control (30.9%). Agro-ecosystems in the plain-mountenouse regions of the country outperform the rest in terms of the share of farmers involved in the production of raw materials for cosmetics and other industries (11.4%), preservation of traditional crops and plant varieties (11.4%), preservation of traditional methods, technologies and crafts (11.4%), protection of natural biodiversity (22.9%), pest control (measures) (25.7%) and employment of workers (17.1%). Agro-ecosystems in mostly mountainous regions of the country are in the best comparative position in terms of the inclusion of farms for preservation of traditional methods, technologies and crafts (11.5%), preservation of traditional services (15.4%), preservation of tradition and customs (7.7%), preservation of historical heritage (3.8%), education of students, consumers, etc. (7.7%), demonstration of productions, technologies, innovations, etc. (7.7%), (measures for) conservation and savings of water (7.7%), (measures for) regulation and improvement of the microclimate (11.5%) and hiring of workers (15.4%).

The share of farms in agro-ecosystems in Protected areas and territories is superior to other types of agro-ecosystems in terms of production of animal feed (10.7%), production of seeds, saplings, animals and others. for farms (10.7%), production of raw materials for the food industry (25%), provision of tourist and restaurant services (3.6%), use of manure on the farm (21.4%), preservation of traditional crops and plant varieties (25%), conservation of traditional species and breeds of animals (10.7%), conservation of traditional scenery and landscape (10.7%), conservation of natural biodiversity (32.1%), conservation of air

purity (14.3%), (measures for) regulation and improvement of the microclimate (10.7%) and protection of plant and/or animal gene pool (17.9%).

The agro-ecosystems in mountenouse regions with natural constraints occupy leading positions in the country in terms of the share of the participating farms in the production of many agro-ecosystem services - production of products for direct human consumption (71.4%), production of animal feed (10.7%), seed production, saplings, animals, etc. for farms (10.7%), production of raw materials for the food industry (32.1%), own processing of agricultural products (17.9%), provision of tourist and restaurant services (3.6%), use of manure on the farm (25%), provision of services to end users (3.6%), preservation of traditional crops and plant varieties (17.9%), preservation of traditional species and breeds of animals (17.9%), preservation of traditional methods, technologies and crafts (14.3%), preservation of traditional products (17.9%), preservation of traditional scenery and landscape (10.7%), improvement of scenery and landscape (10.7%), preservation of tradition and customs (7.1%), training and advice of other farmers (10.7%), demonstration of production, technology, innovation, etc. (7.1%), protection of natural biodiversity (35.7%), protection against soil erosion (28.6%), protection and improvement of soil fertility (32.1%), protection and improvement of soil purity (25%), protection of purity of surface waters (21.4%), (measures for) regulation of outflow of water (10.7%), protection of air purity (14.3%), (measures for) reduction of greenhouse gas emissions (10.7%), (measures for) protection from storms (7.1%), conducting a scientific experiment (7.1%), and providing free access on the farm to outsiders (17.8%).

On the other hand, farmers in ecosystems in non-mountainous regions with natural constraints participate in the conservation and supply of a limited range of agro-ecosystem services, outperforming other agro-ecosystems in some important areas such as conservation of natural biodiversity (28.6%), protection and improvement of soil purity (28.6%), protection of the purity of the groundwater (14.3%), (measures for) regulation of the proper outflow of water (14.3%), (measures for) protection against floods (14.3%), (measures for) protection against fires (14.3%), use and recycling of waste, composting, etc. (14.3%) and protection and improvement of non-agricultural ecosystems (14.3%). Significant differences in the preservation and provision of services of different types in the main specific and principled ecosystems of the country, and in different geographical and agricultural areas is a sign of different potential and “specialization” in supplying the main types of services

from different agro-ecosystems in the country as well as of the uneven development of this activity among the agricultural producers in the different regions and ecosystems of the country.

The share of farms with different production specialization involved in the preservation and supply of agro-ecosystem services gives a good idea of the contribution of different types of production and specific agro-ecosystems to agro-ecosystem services of different types. For example, agro-ecosystems with field crops contribute to a relatively smaller number of agro-system services compared to other production systems in the country. However, this specific type of agro-ecosystem is superior to the others in two respects - in terms of the share of farms involved in the production of animal feed (21.4%) and fire protection (measures) (21.4%). The vegetables and mushrooms sector is leading in the country in terms of the share of participating farms in the production of products for direct human consumption (83.3%), on-farm use of sludge from water treatment (5.5%), (measures of) storage and savings of water (11.1%), pest control (measures) (38.9%) and disease control (measures) (44.4%).

The perennials sector provides a wide variety of agro-ecosystem services, but surpasses the others only in the share of farms participating in the provision of tourist and restaurant services (1.7%) and protection against soil erosion (21.1%). The grazing animals sector occupies leading positions in the country in terms of the share of farmers contributing to a number of agro-ecosystem services - production of raw materials for the food industry (45.4%), own processing of agricultural products (18.2%), use of manure on the farm (18.2%), provision of services to end users (9.1%), conservation of traditional species and breeds of animals (27.3%), conservation of traditional services (27.3%), protection of surface water purity (27.3%), protection of purity of air (18.2%), (measures for) reduction of greenhouse gas emissions (9.1%), use and recycling of waste, composting, etc. (18.2%), protection of plant and/or animal gene pool (27.3%), granting free access to the territory of the farm to outsiders (18.2%) and protection and improvement of non-agricultural ecosystems (27.3%). The specialized holdings in pigs, poultry and rabbits contribute to a very limited number of agro-ecosystem services, but in several respects occupy leading positions in the country where every third producer is involved in the protection and improvement of soil purity, protection of groundwater purity, (measures for) regulating the proper flow of water, and hiring workers.

The field crops sector surpasses the others only in terms of preservation of traditional crops and plant varieties (9.1%), while those specialized in mixed livestock for two types of agroecosystem services - providing services to other farms and agricultural organizations (7.7%) and regulation and improvement of the microclimate (15.4%). Specialized in mix crop and livestock farms participate in the supply of a wide range of agro-ecosystem services, as a relative number of participants occupy a leading position in the production of seeds, saplings, animals, etc. for farms (14.8%), preservation of traditional scinery and landscape (14.8%), improvement of scinery and landscape (11.1%), preservation of historical heritage (7.4%), training and advice of other farmers (14.8%), protection and improvement of soil fertility (25.9%), (measures for) storage and saving of water (11.1%), (measures for) protection against storms (7.4%) and conducting a scientific experiment (7.41%). Farms specializing in bee families are characterized by the highest share of participants in the production of raw materials for cosmetics and other industries (10%), preservation of traditional species and breeds of animals (30%), preservation of traditional methods, technologies and crafts (40%), preservation of traditional products (20%), preservation of tradition and customs (20%), demonstration of productions, technologies, innovations, etc. (10%) and conservation of natural biodiversity (30%). Significant sectoral differences in the preservation and supply of services of different types are a sign of both the different "specialization" in the supply of the main types of services from farms with different specializations and the uneven development of this activity. The later requires further research into the links between specialization and agri-ecosystem services, as well as measures to expand and diversify this activity across all farm groups.

4. Dominating mechanisms and modes of governance of agro-ecosystem services in Bulgaria

Our study has found out that a great variety of market, private and collective modes of governance have been used to govern ecosystem services in Bulgarian agriculture (Table 4.1). Since there has been multiple "failures" of market and private sectors to provide adequate agro-ecosystem services a great number of modes of public interventions have been introduced – fundamental property rights modernization, public support, provision, regulation, taxation etc. (Table 4.2).

Individual governance forms have distinct advantages and disadvantages for participating agents and for the overall supply of "needed" agro-ecosystem services in the country. Detailed assessment of efficiency and potential of dominating governance forms is presented in other publications of the author (Bachev, 2009, 2020).

Table 4.1. *Market, Private and Collective Modes of Governance of Agro-ecosystem Services in Bulgaria*

Market forms	**Voluntary Private initiatives**	**Special Private Contract**	**Special Private Organization**
Spotlight sales; Classical contracts; Eco-visits, hunting, fishing, collecting wild plants and animals; Organic products; Special origins and protected origins; "Fair trade" products; Farm-gate Sale; Own harvesting by the client; Farm eco-training; Eco-tourism, horseback riding, fishing; Eco-restaurants	Movements for Sustainable agriculture; Voluntary "Codes for eco-behavior"; Voluntary standards; "Good will"; Charity actions	Eco-contracts and cooperative agreements between farmers and interested businesses or communities involving payment for ecosystem services and resulting in production methods (improved pasture management, reduced use of agro-chemicals, conservation of wetlands), limiting water pollution, protection against floods and fires, etc.; Joint investment in eco-projects and ecosystem services	Family farms; Cooperative farms; Agro companies; Public farms; Eco-associations; Eco-cooperative; Specialized organization for restoration, maintenance and improvement of ecosystem services; Public-private partnerships; Protected Trademarks, Origins, Products, etc.

Source: Authors

Table 4.2. *Forms of Public Interventions in Agro-ecosystem Services in Bulgaria*

New Property Rights and Enforcement	Public Regulations	Public Taxation	Public Support	Public Provision
Rights for a clean and beautiful environment, biodiversity; Private rights on natural, biological and environmental resources; Collective rights over irrigation waters, pastures, etc.; Private rights for profit-oriented management of natural resources; Tradable pollution quotas (permits); Private rights to intellectual products, origins, (protection) of ecosystem services; Rights for issuing eco-bonds, shares in ownership; Private liability for pollution; Provide legal personality rights to a part or entire ecosystems	Regulations for organic farming; Regulations for Trading Ecosystem Services Protection; Emissions and use quotas for products and resources; Regulations for the introduction of alien species, genetically modified crops; Prohibition of certain activities, use of resources and technology; Nutrition and pest management standards; Regulations to protect water from nitrate pollution; Regulations for biodiversity and landscape management; Licensing for the use of water and agro-ecosystems; Rules and quotas for the use of sewage sludge; Quality and safety standards; Standards for good agricultural practices; Compulsory eco-education; Certification and licensing; Mandatory eco-labeling; Identification of threatened areas and reserves; Set-aside measures; Inspections, fines, termination of activity	Tax preferences; Eco-taxes on emissions and products; Fees for overproduction of manure; Fees on manufacturing or export for financing innovation; Waste tax; Farmland tax	Recommendations, information, demonstrations; Direct payments; Subsidies for eco-actions of farms, businesses and communities; Preferential Credit; Public eco-contracts; Government procurement (water and other resources); Price and production aid for organic production and special origins; Financing of eco-education; Assistance for farmers and environmental associations; Collection of fees to pay for provision of ecosystem services	Scientific research; Market information; Agro-meteorological forecasts; Sanitary and veterinary control, vaccinations, preventive measures; Public Agency (Company) for important ecosystems; Applying the "precautionary principle"; Environmental monitoring; Eco-forecasts; Risk Assessment

Source: Authors

Our field survey has found that a large proportion of Bulgarian farms use some specific mechanisms in making decisions about managing their activities related to agroecosystem services (Figure 4.4). However, a different proportion of farms apply specific mechanisms to manage the various aspects of the activity related to the provision of agro-ecosystem services. In the Production of products for direct consumption, all farms use some "special" forms. The modes and efficiency of governance of this type of activity of Bulgarian farms have been widely studied and presented in academic literature (Bachev, 2010, 2018). A relatively large part of the farms also uses specific mechanisms in the management of Soil Protection, Water Protection, Biodiversity Protection, and Landscape and Scenery Protection. Fewer farms use specific forms to manage the supply of the other main types of agro-ecosystem services.

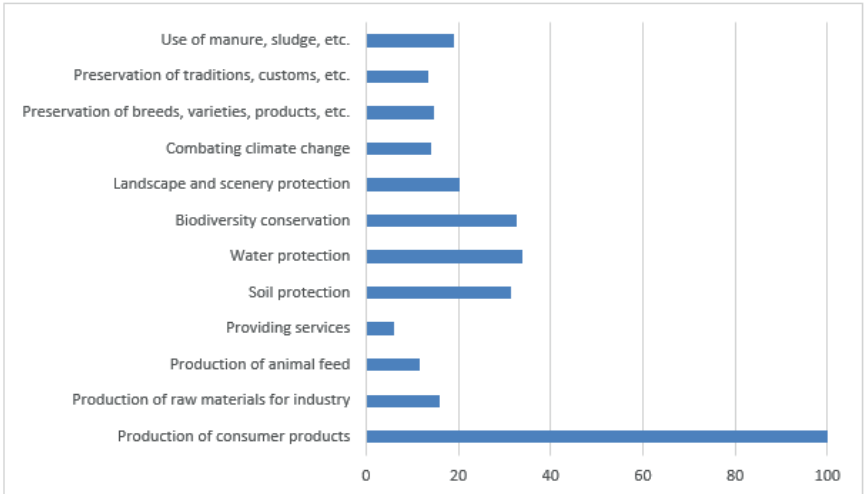

Figure 4.4. *Share of farms using specific mechanisms for decision-making of activity associated with agroecosystem services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

The specific forms and mechanisms applied for the effective governance of different types of agro-ecosystem services are quite different. For most farms, independent internal (*Independently by the farm*) management is essential for the supply of all major agroecosystem services (Figure 4.5). This form is practiced by the vast majority of farms, in agro-ecosystem services with the character of "local or public goods" (inability to sell and protect rights, high specificity and uncertainty, low frequency of exchange with a particular user, etc.) - Soil protection, Water protection, Biodiversity protection, Landscape

and scenery protection, Climate change control, Preservation of breeds, varieties, products, etc., and Use of manure, sludge, etc. This form is least used in making management decisions concerning the production of raw materials for industry, where there is a high dependency (specificity of the product, capacity, delivery time, location, etc.) of the particular buyer(s) and market(s) and there is a need to use more effective forms of coordination and governance.

Collective decision-making with other farmers and agents is a form that is applied by a significant part of the farms in relation to the Preservation of traditions, customs, etc., and a large part of them in the Production of raw materials for industry, Water protection, Biodiversity protection, Landscape and Scenery protection, and Combating climate change. The collective form for most of these services (with the character of "local or public goods") is determined by the need for coordinated "collective action" (high dependence of assets and actions) to achieve a certain positive result. The collective organization in the production of raw materials for the industry is most often required by the need for a certain minimum volume and standardization for efficient market or vertically integrated trade (achieving efficiency in wholesale trade, compliance with the requirements of processors for quality, volume and frequency of supplies, etc.) or to oppose an existing (quasi)monopoly, etc.

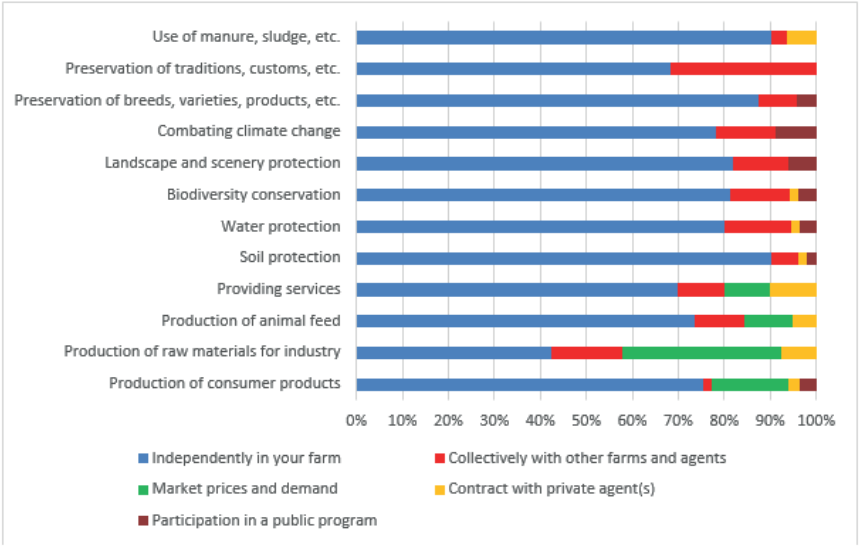

Figure 4.5. *Mechanisms used in decision-making on farm activities related to different types of agro-ecosystem services in Bulgaria*

Source: Survey of agricultural producers, 2020

Market mechanism and market prices and demand are exclusively and widely applied only to traditional (commercial) farming products and services - mostly in the Production of raw materials for industry, Production of products for direct consumption, and in less extent in Production of animal feed, and Provision of services. As mass and standard products are traded, the market works well and there is no need to use a more expensive special form to govern the relationship between supplier and buyer.

A special private form - Contract with a private agent/s is used when it is necessary to regulate in detail the relations of the parties due to high unilateral or bilateral dependency of assets, high frequency of transactions between the same agents, and uncertainty and risk of market trading (specification of the product, delivery time, a form of payment, interlinked transactions, a guarantee of trade between the parties, etc.). The contractual form is applied by every tenth farm in the provision of services, and a large part of the farms in the production of raw materials for industry, production of animal feed, and the use of manure, sludge, etc.

Public intervention (support) is required when private and market forms cannot fully govern the supply of certain agro-ecosystem services due to public nature, low appropriability, high specificity and uncertainty, etc. Participation in a public program is a form that is applied most by farms in the Fight against climate change, Landscape and scenery protection, and Preservation of breeds, varieties, products, etc.

Depending on the specificity of production (and the production agro-ecosystem), farms with *different specializations* use to unlike extent specific mechanisms for deciding on the activity related to agroecosystem services of different types (Figure 4.6). The largest share of farms specialized in Field crops use specific mechanisms in the production of raw materials for industry. The most widespread special mechanisms for the production of animal feed are practiced at Mixed crop-livestock holdings. Every third producer in Pigs, Poultry and Rabbits applies similar mechanisms for (standard) services provision. A significant part of the specialized in Permanent crops, and Mix crops need special management mechanisms for soil Protection. In water protection, most of the holdings in Permanent crops, Mix crop-livestock, and Mix crops adapt special forms.

Farms in Permanent crops, Mixed Livestock, and Mixed crop-livestock use the most specific mechanisms for biodiversity conservation. One-third of the

specialized holdings in Pigs, Poultry and Rabbits apply special forms for landscape and scenery protection. The largest part of the farms with Mix crops, and Grazing livestock apply special management mechanisms in the fight against climate change. For the preservation of breeds, varieties, products, etc. and for the preservation of traditions, customs, etc. every third farm with pigs, poultry and rabbits needs such mechanisms. The majority of those specialized in Pigs, Poultry and Rabbits, and Mixed crops apply special mechanisms in making management decisions for the use of manure, sludge, etc.

At the same time, however, there is a significant variation in the type of specific mechanisms used to make management decisions by farms with different specializations. For example, for the Conservation of Natural Biodiversity, every third farm specializing in field crops applies Participation in a public program. When managing the supply of the same ecosystem service, two-thirds of the farms with bee colonies and one-third of those in Mixed crops do it Collectively with other farms and agents. Similarly, when managing the fight against climate change, half of the Mixed Crop-Livestock holdings do so Collectively with other farmers and agents, while one-fifth of the farms specializing in Permanent crops use Participation in a public program. For some agroecosystem services with a high (capacity, location, product, etc.) specificity to a particular buyer(s) no (free)market forms (Soils protection, Waters protection, Protection of biodiversity, Preservation of landscape and scenery, Combating climate change, Preservation of breeds, varieties, products, etc.) or public forms (Production of raw materials for industry, Production of animal feed, and Services supply), or both market and trilateral with public involvment forms (Preservation of traditions, customs, etc., and Use of manure, sludge, etc.) develop. For the later mostly or exclusively private (internal, contract, collective, etc.) modes are used by all types of farms to govern their activity and relations associated with ecosystem services.

Our study has found no significant differences found in specific modes of management of specific agro-ecosystem services applied by farms of different juridical types (Sole Trader, Cooperative, etc.), in different ecosystems (mountainous, plain, etc.) and regions of the country. Thus differentiation of the managerial modes mostly depends on the specificity of the agroecosystem services and the subsector of agricultural production.

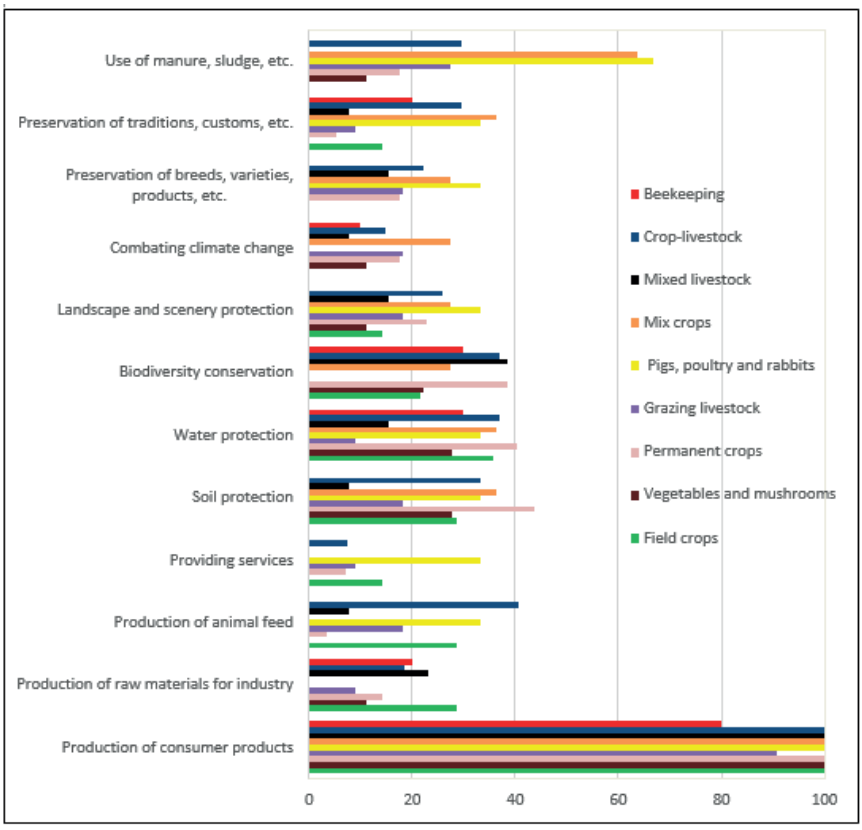

Figure 4.6. *Share of farms with different specialization, using specific mechanisms in decision-making on the activity related to agroecosystem services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

5. Private, collective and market modes

Most of the surveyed farms apply special private and market forms to govern the supply of agro-ecosystem services. Over 17% of all farms are certified for organic production, and a small part combines mixed organic and traditional production (Figure 4.7). Formal certification is associated with additional costs for farmers (conversion period, certification, current control, etc.) and consumers (premium to market price), but also brings significant benefits for both parties. Farmers have a formal guarantee for the authenticity of their products, receive a price bonus and public subsidies, develop a reputation and market position for special and high-quality products. Consumers

receive a guarantee of authenticity and low-cost acquisition of products related to agri-ecosystem services. The process is controlled by an independent (third) party, which increases trust and reduces transaction costs. This threelateral market-oriented form will become even more important in the future given the growing consumer demand in the country and on international markets, and the further greening of the CAP in the next programming period and increasing incentives to expand organic production in the EU.

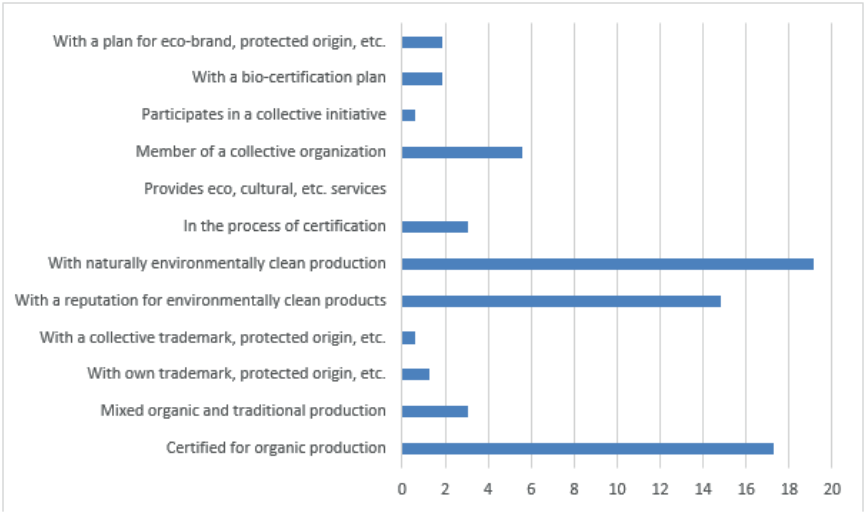

Figure 4.7. *Share of farms applying diverse private, collective, and market forms for the supply of agro-ecosystem services in Bulgaria (percentages*)

Source: Survey of agricultural producers, 2020

Most of the agricultural holdings have a built Reputation for ecologically clean products, or With naturally ecologically clean production. Informal private and collective forms such as building a "good reputation" for special quality, products, origins, etc., of certain farms, ecosystems and entire regions are widespread in the country's agricultural practice. In the future, they will continue to effectively manage the relationship between producers and consumers for the supply of agri-ecosystem services. Transaction costs are low, as long-term "personal" relationships ("clientalization", high frequency) are developed for trading certain products, primarily in local and regional markets, and opportunism is punished by the cessation of trade and "bad" reputation.

Due to high costs (registrations, control, etc.) and low returns, very few farms apply other formal private or collective forms of agri-ecosystem services management. A little over 5% are members of a collective organization, a little over 1% are With own trademark, protected origin, etc., less than 1% participate in a Collective Trademark, Protected Origin, etc., or in a Collective Initiative. However, given the significant transactional benefits (sales to large retail chains, exports, premiums, etc.), the number of farms investing in such special private and market forms is gradually increasing. In the process of certification are 3% of all farms are, With a plan for bio-certification and With a plan for eco-brand, protected origin, etc. almost 2%.

Nearly three-quarters of the surveyed farms reported that they participate in some initiative for the protection of ecosystems and ecosystem services. The majority of farms Implement own (private) initiative in this regard (Figure 4.8). Quite a part of the holdings Implements informal Initiatives of other farms. Almost every tenth reports participating in a State initiative related to the protection of ecosystems and ecosystem services. This hybrid (public-private, trilateral) form is also usually associated with receiving certain subsidies or other support in return for certain commitments for improved environmental management. Just over 2% of farms Have a contract with the state to implement such an initiative.

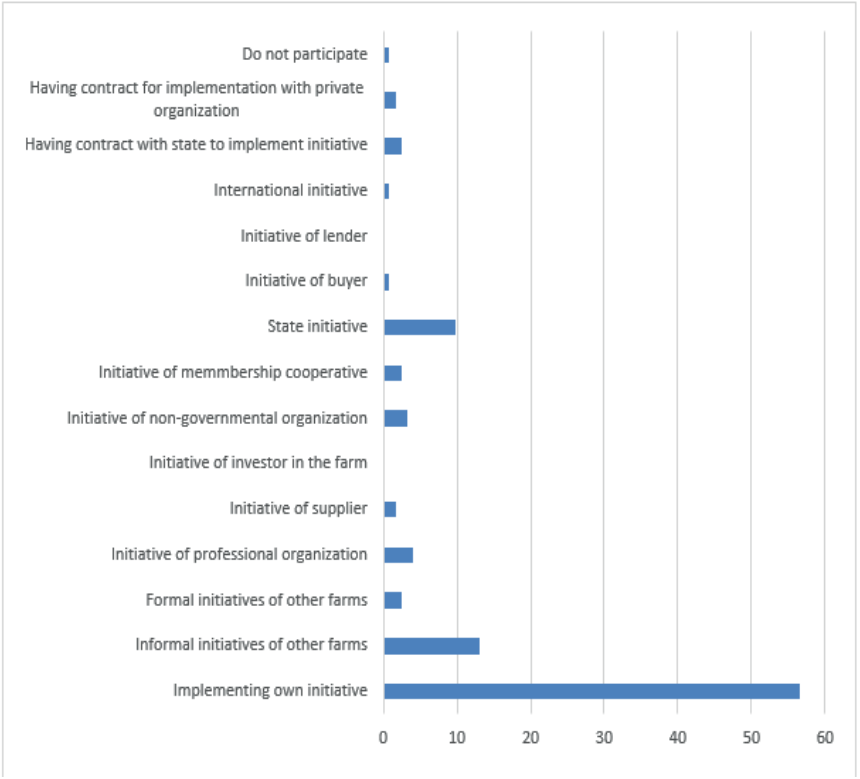

Figure 4.8. *Share of farms participating in an initiative for the protection of ecosystems and ecosystem services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

A small share of farms participates in other private and collective formal environmental management initiatives - Formal initiatives of other farms, Initiative of a professional organization, Initiative of a non-governmental organization, Initiative of a cooperative of which they are members, and International initiative. For a small part of the farms, the initiative is of (induced by) Supplier of the farm or by Buyer, and even Have a contract with a private organization for implementation of eco-initiative. All this shows that the effective forms that farms and other stakeholders use to govern their relationships and actions related to environmental protection and agri-ecosystem services are diversifying.

6. Providing outside access to the territory of the farm

Providing external access to the territory of agricultural holdings is a basic form of supply and/or consumption of ecosystem services in agriculture. The share of farms that provide access to outsiders on their territory varies depending on the agroecosystem services used (Figure 4.9). A significant part of the farms allows External visits to the farm, and Collection of information from individuals and institutions. Relatively smaller is the number of farms that allow Passage through the farm. Every tenth farm allows Grazing of animals of other individuals and farms, and Collection of unnecessary for the farm harvest, including residues. Quite a few of the Bulgarian farms also provide their territory for Scientific experiments and demonstrations, Tourism, and Collection of wild plants and animals. To the least extent, the territory of the farms is available for the Organization of private events (entertainment, etc.), Hunting and fishing, and Organization of public events. An insignificant part of the holdings also indicated Other reasons such as Veterinary services, and Control bodies and experts.

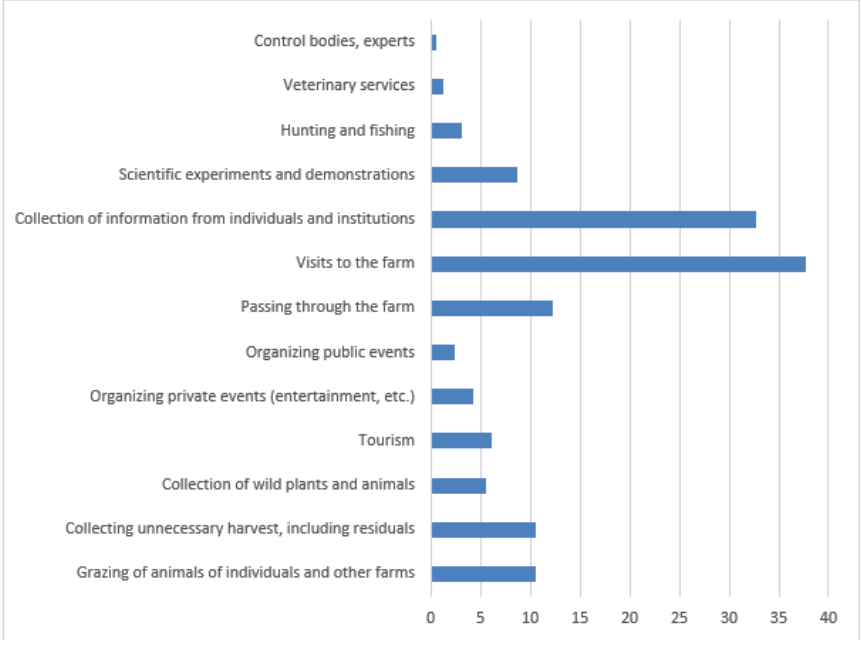

Figure 4.9. *Share of farms that provide external access to their territory for using of various ecosystem services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

For the different types of external access on the territory of the farms, specific forms for governing the relationship of agents are practiced (Figure 4.10). Free and unrestricted access is the dominant form of providing access to the territory of the farm for grazing animals of individuals and other farms, Collection of wild plants and animals, Tourism, Organizing private events, Organization of public events, Passage through the farm, Veterinary services, and Control bodies and experts. This form is also practiced by a large number of farms for the Collection of unnecessary harvest, residues, Collection of information from individuals and institutions, Scientific experiments and demonstrations, Visits to the farm, and Hunting and fishing. All these agro-ecosystem services are treated as public goods and their use and consumption are "managed" by providing free and unrestricted access by farm owners. Most of these services are difficult to regulate or exchange as private goods due to high uncertainty and enforcement costs.

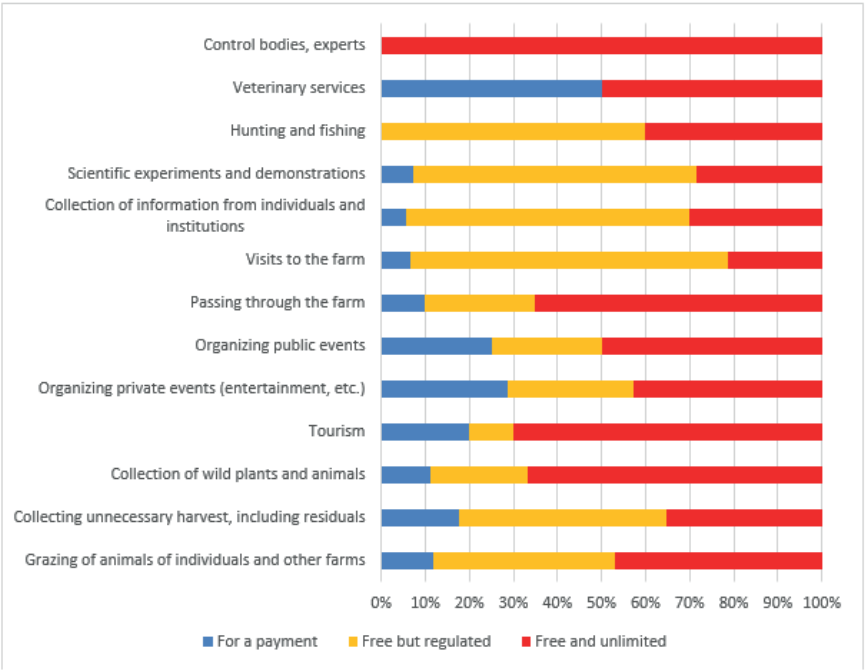

Figure 4.10. *Type of external access to farm's territory for use of different ecosystem services in Bulgaria*

Source: Survey of agricultural producers, 2020

In many cases the main form for providing access to the territory for the farm is Free but regulated - for Collection of unnecessary crops, residues, Visits to the farm, Collection of information from individuals and institutions, Scientific experiments and demonstrations, and Hunting and fishing. This form is widely used by a large number of farms in allowing access to the territory for Grazing animals of individuals and other farms, Collection of wild plants and animals, Organization of private events, Organizing public events, and Passing through the farm. The use and consumption of this type of agro-ecosystem services are managed through a private form - regulation, and they are provided free of charge by farm owners. The form of free provision is determined either by the additional benefits received for the farmers (in case of grazing animals of individuals and other farms, collection of unnecessary crops, residues, collection of wild plants and animals, organization of private and public events, etc.), or from the high costs of enforcement - constant control, penalties, disputing through a third party, etc. (in Passing through the territory of the farm, Hunting and fishing, etc.). Here, regulation is needed to plan and coordinate external access and/or limit consumption to maintain a sustainable supply of agro-ecosystem services.

A portion of farms uses a market form of exchange against payment of a price to provide external access to the territory of the farms. This form of sale of services is practiced in grazing animals on individuals and other farms, collection of unnecessary crops, residues, collection of wild plants and animals, tourism, organizing private events, organizing public events, passing through the farm, visits to the farm, gathering information from individuals and institutions, scientific experiments and demonstrations, and veterinary Services. The market form is preferred because it governs well the supply of "limited" agro-ecosystem services and relationships of counterparts. Market trading is beneficial for both parties, who mutually profit from the transaction, as the terms of exchange are easy for no or low-cost negotiation, control and sanctioning. Here, the classic contract of "spotlike" exchange under standard conditions applies, and payment is made on the spot or in advance to avoid any possible opportunism.

Agricultural holdings with different specializations provide unequal external access on the territory to farms for using different agro-ecosystem services (Figure 4.11). To the greatest extent outside access to the territory of the farm for grazing animals of individuals and other farms is provided by holdings

specialized in Grazing livestock, and Mixed crop-livestock operations. For Harvesting of unnecessary output, incl. Residues, most farms providing external access to their territory are among specialized in field crops, and crop-livestock. The largest share of mix crop-livestock farms allows the collection of wild plants and animals and tourism in their territory. Specialized in grazing livestock to the greatest extent provide external access on the territory of their farms for Organizing private events (entertainment, etc.), and Organizing public events. Most farms that allow passage through the farm territory are among those specialized in permanent crops, and grazing animals. Most visits to the farm are allowed by farms specializing in grazing animals, and field crops. The largest share of farms that allow the collection of information from individuals and institutions are among those specializing in permanent crops, and grazing animals, and for scientific experiments and demonstrations among those specializing in grazing animals, and Bee families. Every tenth farm with bee families also allows the use of its territory for hunting and fishing. Therefore, in addition to the product specialization, there is a certain specialization in the provision of agro-ecosystem services related to external access on the territory of the farms.

Farms with different specializations use unequally different forms for ensuring open access to the territory of farms for the use of agro-ecosystem services. The preferred most efficient mode is (pre)determined by the specifics of the production and the use of territory and/or the preferences of the owners/managers of the individual farms and the external users of the related agro-ecosystem services. For example, for farms specialized in field crops, vegetables and mushrooms, and mixed livestock, Free but regulated access is the only form used for providing external access to the territory for grazing animals to individuals and other farms. At the same time, most of the farms specializing in permanent crops practice Free and Unrestricted Access, while the remaining one-fifth apply for Paid access. Similarly, relations with clients associated with Harvesting unnecessary output, incl. residues on the territory of farms specialized in Vegetables and Mushrooms, Grazing livestock and Mixed crops are managed entirely on a contractual basis for payment. At the same time, for all other groups of farms, the used form is either Free but regulated or Free and unrestricted access.

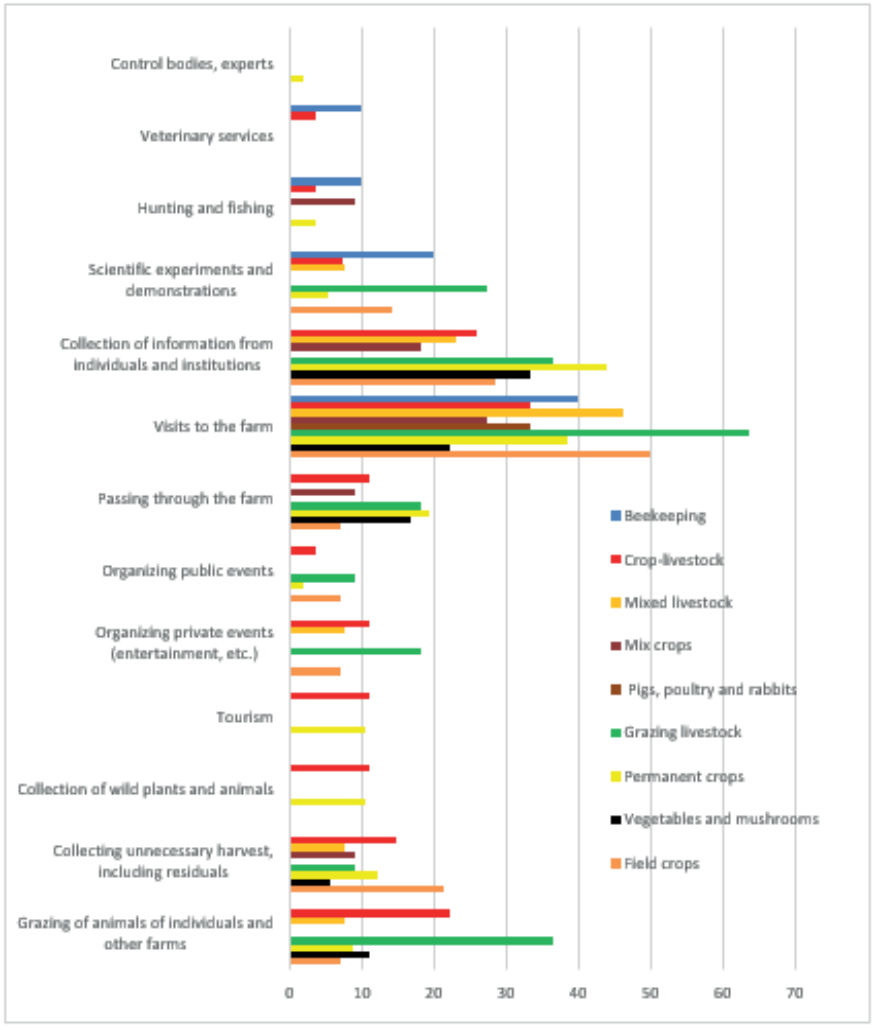

Figure 4.11. *Share of farms with a different specialization that provides external access to their territory for use of agro-ecosystem services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

7. Efficiency and importance of farms' ecosystem services provision

According to the majority of managers of the surveyed farms, their activity for the protection of ecosystems and their services is associated with an Increase in the total production costs of the farm, Increase of the specialized costs for nature protection, Increase of long-term investments, Increase of management costs and efforts, Growth of the costs of participation in state aid programs, Increase in the costs of studying the regulations and standards, and Increase in the costs of registrations, tests, certification, etc. (Figure 4.12). Moreover, for the majority of farms this activity leads to a high increase in the total production costs of the farm, the specialized costs for nature protection, long-term investments, the costs for participation in state aid programs, and the costs of registrations, tests, certification, etc. At the same time, for only a small part of all farms, environmentally-friendly activity is associated with a reduction in the various types of production and transaction costs.

At the same time, however, the vast majority of farms report that their activities for the protection of ecosystems and their services are also associated with an Increasing the economic efficiency of the farm, Increasing the ecological efficiency of the farm, Increasing the social efficiency of the farm, Improved protection of ecosystems in the region, and Improved protection of ecosystems in the country. At the same time, the majority of farms estimate that their environmentally friendly activity leads to a high increase in the economic efficiency of the farm, the ecological efficiency of the farm, and the protection of ecosystems in the region. None or very few of the surveyed farms indicate that their activities for the protection of ecosystems and their services are related to reducing the economic efficiency, environmental and social efficiency of the farm, and the protection of ecosystems in the region and the country. However, a significant share of farm managers believes that their efforts and costs to protect ecosystems and ecosystem services do not lead to changes in the social efficiency of the farm, and improved protection of ecosystems in the country.

There is significant differentiation in the level of costs and efficiency of farm activities related to the protection of ecosystems and ecosystem services (Figure 4.13). *A high* increase in the total production costs of the farm was reported by half of the farms specializing in field crops and mixed crop production, three-quarters of those in grazing animals, and all of those in bee colonies. The share of farms with a high increase in these costs is the smallest among

holdings specialized in vegetables and mushrooms (every third) and none in pigs, poultry and rabbits. The largest share of farms with a high increase in specialized costs for nature protection are among those specialized in field crops, mixed crop production and crop and mix crop-livestock production, and bee families. At the same time, relatively few mixed livestock farms reported a high increase in this type of cost, and none among those specializing in grazing animals and pigs, poultry and rabbits.

A high Increase in long-term investments for the protection of ecosystems and ecosystem services is most typical for farms specializing in Vegetables and mushrooms, Herbivores, Mixed crop production, Crop and livestock production, and Bee families. The lowest share of farms with high costs of this type is in Permanent crops, and in none of the surveyed farms in Pigs, poultry and rabbits. High increases in management costs and efforts to protect ecosystems and ecosystem services are recorded in most of the farms specializing in Vegetables and Mushrooms and Herbivores, and Mixed crop production and Bee Families. At the same time, relatively few of the farms in Perennials and Mixed Livestock, and none of those in Pigs, Poultry and Rabbits reported a high increase in these costs. For a high increase in the costs of private arrangements and contracts related to the protection of ecosystems and ecosystem services, most farms report in Field Crops, and Bee Families, while in other groups a small number or none of the holdings have growth in these costs. A high increase in the costs of cooperation and association with others related to the protection of ecosystems and ecosystem services is observed in all farms specializing in beekeeping, while in other categories of farms this type of cost is not typical.

Figure 4.12. *Costs and efficiency of the activity of farms for protection of ecosystems and their services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

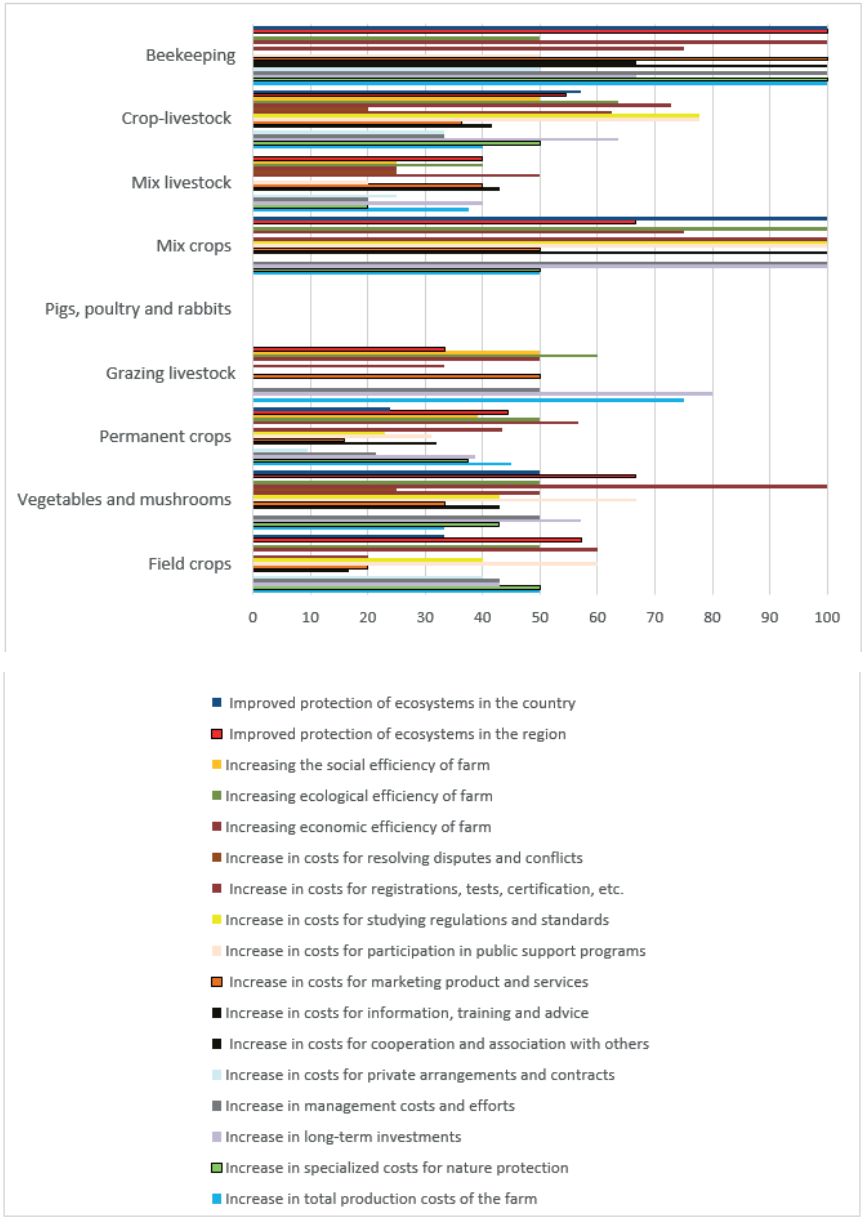

Figure 4.13. *Share of farms with a high increase in costs and efficiency of activity for the protection of e cosystems and their services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

The most numerous are the farms with high Increase in costs for information, training and advice on ecosystem protection and ecosystem services in those specialized in Mixed Crop Production, and Bee Families, and relatively few in Field Crops, and none for Grazing animals, and Pigs, poultry and rabbits. The largest share of farms with a high increase in the cost of marketing the product and services related to the protection of ecosystems and ecosystem services is in those specializing in grazing animals and mixed crop production, bee families, relatively few in field crops, and perennials, and none among those in pigs, poultry and rabbits. Most of the farms report high growth in the costs of participation in state aid programs related to the protection of ecosystems and ecosystem services, among those specialized in field crops, vegetables and mushrooms, mixed crop production, and mix crop-livestock. On the other hand, relatively fewer farms reported similar growth among specialized in perennials, and mixed livestock and none of those with grazing animals and pigs, poultry and rabbits.

The high growth of expenditures for studying regulations and standards related to the protection of ecosystems and ecosystem services was noted by the largest number of farms with Mixed crop produces, and Crop-livestock specialization. At the same time, a relatively small proportion of farms specializing in perennials, and none of those in grazing animals, pigs, poultry and rabbits, mixed livestock and bee colonies reported a similar increase in this type of expenditure. The high growth of expenditures for registrations, tests, certification, etc. related to the protection of ecosystems and ecosystem services is observed in most farms with Mixed Crop Production, Crop-Livestock production, and Bee Families. This share is lowest on farms in field crops, and on none of those in pigs, poultry and rabbits. High growth in the costs of resolving disputes and conflicts related to the protection of ecosystems and ecosystem services is reported by every fourth farm specializing in Vegetables and Mushrooms and Mixed Livestock and every fifth of those in Bee colonies. However, none of the other holdings reported a similar increase in this type of expenditure.

High increase of the economic efficiency of the farm-related to the protection of ecosystems and ecosystem services is most noted in the farms specialized in Field crops, Vegetables and mushrooms, Mixed crop production, Mix crop-livestock production, and Bee families, and the least in those in Mixed livestock, and Pigs, poultry and rabbits. A high increase of the ecological effi-

ciency of the holdings' activity for the protection of ecosystems and ecosystem services is reported by all from Mixed crops farms, and the majority of those with Grazing animals, and Crop and animal husbandry. The lowest share of farms with similar growth is in those specialized in Mixed Livestock, and Pigs, poultry and rabbits. High Increasing the social efficiency of the holdings' activity for the protection of ecosystems and ecosystem services is registered by every second farm specializing in Herbivores and Corp-livestock, a smaller part of those in Perennial crops, and Mixed livestock, and from none of the other categories of holdings.

High improved protection of ecosystems in the region, related to the activity of farms for protection of ecosystems and ecosystem services is achieved mostly by the farms in Field crops, Vegetables and mushrooms, Mixed crop growing, and Bee families, and relatively the least of those with Grazing animals, and Pigs, poultry and rabbits. High improved protection of ecosystems in the country related to the activities of farms for protection of ecosystems and ecosystem services is reported by all those specializing in Mixed crops and Bee families, and most of those in Mix crop-animal husbandry. The share of farms with a similar effect is the lowest in those specialized in field crops, and perennials, and in none of them in grazing animals, pigs, poultry and rabbits, and mixed animal husbandry.

The vast majority of farm managers estimate that the effect of the overall activity of the farm is positive in terms of soils, biodiversity, landscape, and economic development of the region (Figure 4.14). Also, the majority of managers believe that the effect is positive in terms of Air, Surfacewaters, Groundwaters, Climate, Traditional breeds, varieties, products, technologies, and Social development of the region, as a relatively smaller part consider a positive effect in terms of Local culture, traditions, customs, education. However, the share of managers who believe that the whole activity of their farm is not associated with any effect on the individual elements of the ecosystem - Soils, Air, Surfacewaters, Groundwaters, Biodiversity, Landscape, Climate, Traditional breeds, varieties, products, technologies, Local culture, traditions, customs, education, Economic development of the region, and Social development of the region.

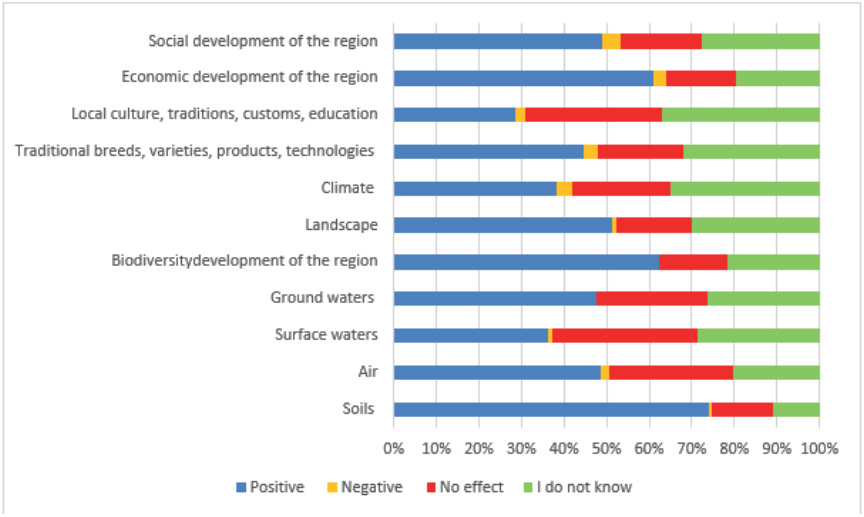

Figure 4.14. *Effect of farms' overall activity on different elements of ecosystems and their services in Bulgaria*

Source: Survey of agricultural producers, 2020

In addition, a significant part of managers do not know the effect of the overall activity of agriculture on various elements of the ecosystem - Soils, Air, Surfacewaters, Groundwaters, Biodiversity, Landscape, Climate, Traditional breeds, varieties, products, technologies, Local culture, traditions, customs, educated, Economic development of the region, and Social development of the region. The later requires both deepening and expanding independent assessments of the effects of farming on the individual components of ecosystems, and better informing farmers about their negative and /or positive contribution to environmental protection and ecosystem services.

Just over half of the surveyed managers assess the importance of their activities for the protection of agro-ecosystems and agro-ecosystem services as High for their farm, and 47% High for themselves (Figure 4.15). A significant share of managers also believes that their activities for the protection of agro-ecosystems and agro-ecosystem services are of high importance for the region of their farm. There is also a significant number of managers who believe that this activity has a high environmental value, and value for future generations. A relatively smaller part of the managers believes that such activity

is of High importance for the community in the region, High market value, and High economic value. At the same time, an insignificant share of managers is convinced that their activity for the protection of agro-ecosystems and agro-ecosystem services has a High contract value, and a High social value or is Without any value, as none of the respondents believes that this activity has a High cultural value.

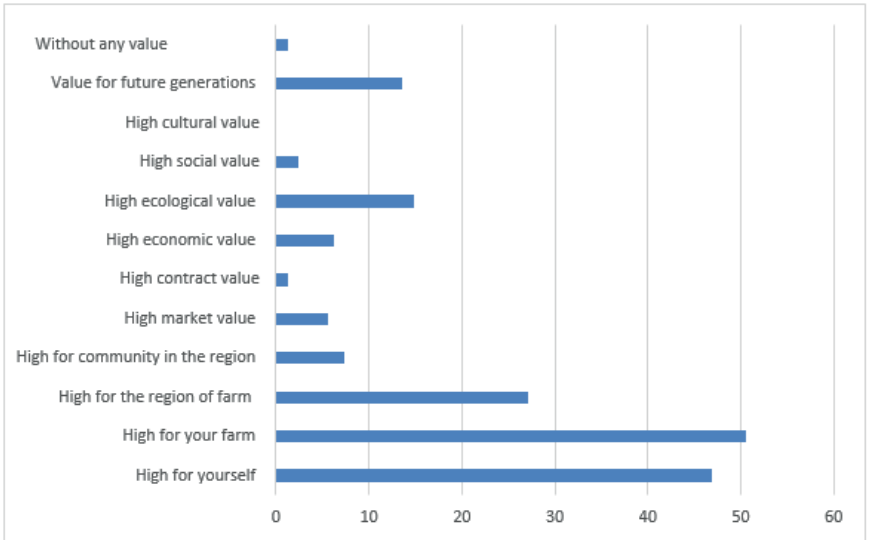

Figure 4.15. *Assessment of farm managers of the importance of their activity for the protection of agro-ecosystems and agro-ecosystem services in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

8. Factors in the governance of agro-ecosystem services

The survey allows us to identify personal, organizational, market, institutional and other factors that have the greatest impact on (and predetermine) the activity of agricultural holdings for the conservation of agro-ecosystems and agro-ecosystem services. According to the majority of surveyed managers, the factors that strongly stimulate or limit the activity of farms related to the preservation of agro-ecosystems are Market demand and prices, Market competition, Opportunities to increase profits, Participation in state and European support programs, Financial capabilities, Direct state and European subsidies received, Personal conviction and satisfaction with this activity, Amount of

direct costs for this activity, Access to farmers' advice, Regulatory documents, standards, norms, etc., and State Policy (Figure 4.16).

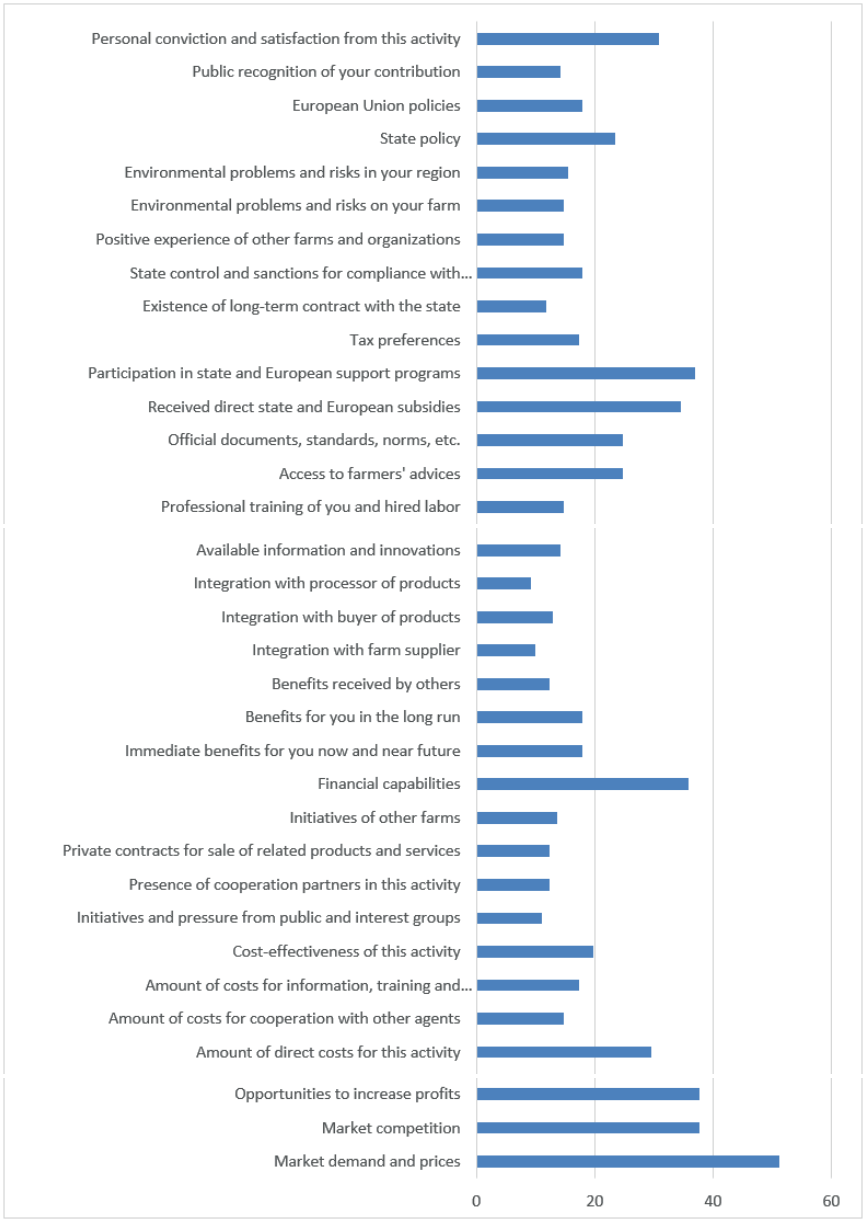

Figure 4.16. *Factors that strongly stimulate or restrict the activity of farms related to conservation of agro-ecosystems in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

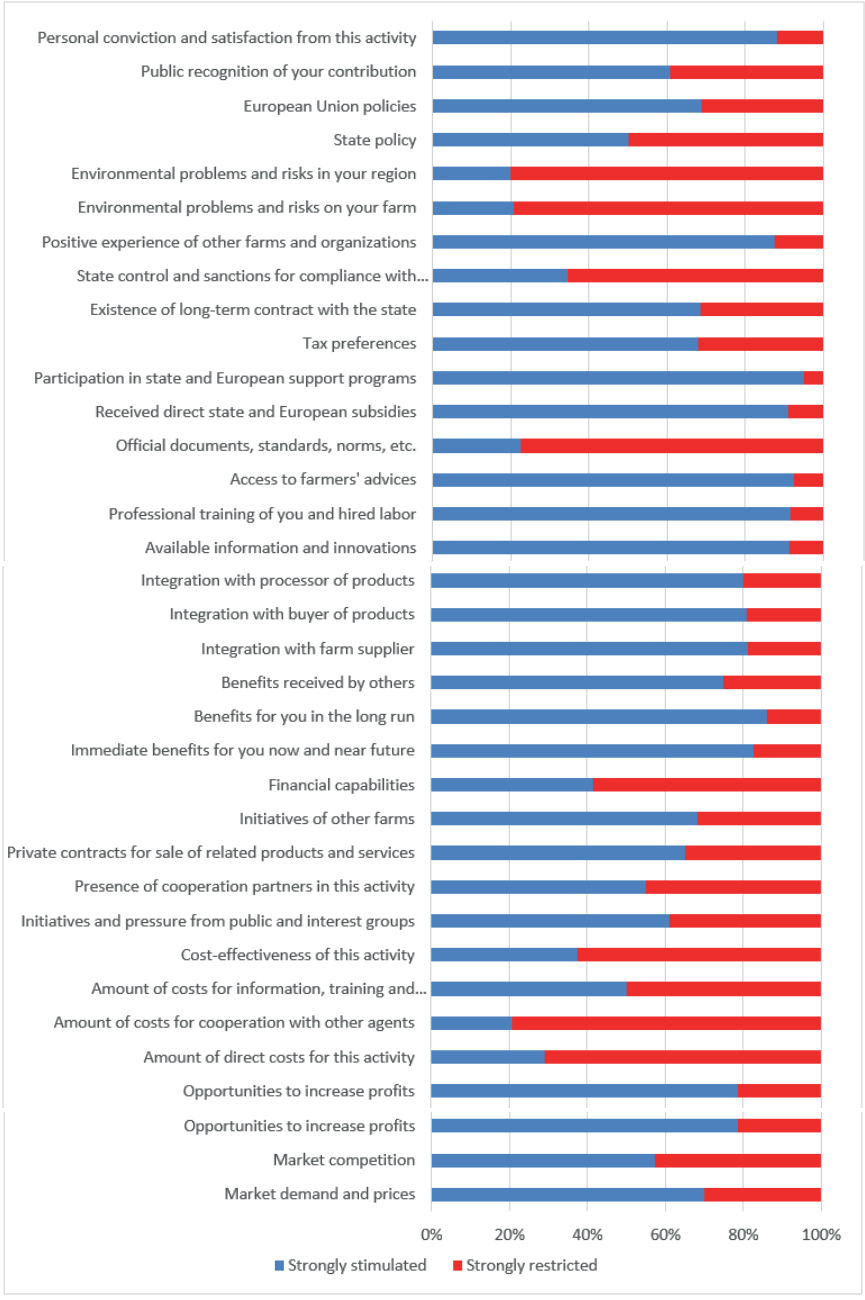

Figure 4.17. *The extent to which farming activities related to the conservation of agroecosystems are stimulated or limited by various factors in Bulgaria (percentages)*

Source: Survey of agricultural producers, 2020

The extent to which the activity for the protection of the agroecosystems of the affected farms is stimulated or limited by different factors is not the same. Factors that *strongly stimulate* the activity of the majority of agricultural producers for protection of agro-ecosystems and their services are: Market demand and prices, Market competition, Opportunities to increase profits, Initiatives and pressure of the public and interest groups, The presence of cooperation partners in this activity, Private contracts for the sale of related products and services, Initiatives of other farms, Immediate benefits for the farm in present and near future, Long-term benefits for the farm, Benefits for others, Integration with the supplier of the farm, Integration with the buyer of the production, Integration with processor, Available information and innovation, Proffesional training of managers and employees, Access to farmers' advices, Received direct state and European subsididies, Participation in state and European support programs, Tax preferences, Existence of a long-term contract with the state, Positive experience of other farms and organizations, Policies of the European Union, Public recognition of contribution, and Personal conviction and satisfaction with this activity (Figure 4.17).

Factors that *severely limit* the activity of the majority of farms for the protection of agro-ecosystems and their services are the Amount of direct costs for this activity, the Amount of costs for cooperation with other agents, Economic efficiency of costs for this activity, Financial capabilities, Regulatory documents, standards, norms, etc., State control and sanctions for compliance with standards, norms, etc., Environmental problems and risks in the farm, and Environmental problems and risks in the region. At the same time, the Amount of information, training and consultation costs, and the State Policy are factors that strongly stimulate the environmentally friendly activity of half of the surveyed farms, and severely limit it for the other half. All these factors are to be taken into account when improving public policies and forms of intervention related to the governance of agro-ecosystems and their services.

9. Conclusion

It is well known that agricultural production makes a significant contribution to the conservation, restoration and enhancement of ecosystems and their services, but also is associated with negative effect and their degradation and demolition ("agricultural disservices"). Therefore, services related to agricul-

tural production and agro-ecosystems are among the most intensively studied, mapped, evaluated, regulated and stimulated. Our study has tried to fill the gap and give initial insights on great variety of agricultural services and ther importance for the farm, region, other ecosystems and agents in Bulgaria. At the current stage of development country's farms maintain or provide a great number of essential ecosystem services among which provisioning food and feed, and conservation of elements of the natural environment prevailing. Besides, there are significant differences in the participation and contribution of agricultural holdings in the protection and provision of agro-ecosystem services in the various specific and principled ecosystems of the country, and major subsectors of agricultural production. The later requires special measures to improve, diversify and intensify this activity of farmers through training, information, exchange of experience, public incentives and support, etc.

The study has also found out that there is significant differentiation of employed managerial forms depending on the type of ecosystem services and specialization of agricultural holdings. Management of agroecosystem services is associated with a considerable increase in the production and transaction costs of participating farms as well as big socio-economic and environmental effects for holdings and other parties. Factors that mostly stimulate the activity of Bulgarian producers for protection of agro-ecosystems and their services are participation in public support programs, access to farmers' advice, professional training, available information and innovation, received direct subsidies, personal conviction and satisfaction, positive experience of others, long-term and immediate benefits for the farm, and integration with suppliers, buyers and processors.

Suggested holistic and interdisciplinary framework for analyzing the structure and management of agro-ecosystem services is to be extended and improved, and widely and periodically applied in the future. The latter requires systematic in-depth multidisciplinary research in this new area, as well as collection of original micro and macro-information on structure of agro-ecosystes services, and forms, efficiency and factors of agroecosystem services management by agents involved in (joint) production and management of agro-ecosystem services of a different type. The accuracy of analyzes is to be also improved by increasing representativeness through enlarging the number of surveyed farms and related agents, applying statistical methods, special "training" of implementors and participants, etc. as well as improving the official system for collecting agricultural, agro-economic and agri-environmental information in the country.

Section 5
Institutional structure of agrarian sludge utilization

1. Introduction

The process of turning wastewater treatment plants (WTP) sludge from "waste into good (product)" is conditioned by various social, economic, technological, agronomic, personal, etc. factors (Bachev & Ivanov, 2021, 2022). An important place in this complex of factors is occupied by the institutional structure in which the various agents related to the process carry out their activities and relationships. Institutional environment and institutions of governance provide opportunities and set constraints for agents, structure and determine their behavior and activity, and ultimately (pre)determine the effectiveness of agro-eco-governance as a whole, and the effectiveness and the degree of use of sludge in agriculture in particular (Bachev, 2020).

In this study, the interdisciplinary methodology of the New Institutional Economics is adapted (Bachev, 2020, 2023; Furubotn & Richter, 2005; Williamson, 2005) and an analysis and assessment of the institutional structure of WTP sludge utilization in Bulgarian agriculture is made.

2. Research methodology

Institutions are generally defined as the 'rules of the game', including the rights and obligations of individual agents, and the system of enforcement of those rights and rules (North, 1991; Furubotn & Richter, 2005). Their analysis covers the formal rights, restrictions and rules (regulated by various laws, regulations, etc.) and the official bodies and mechanisms for controlling, enforcing, disputing, etc. (government agencies, court, etc.). The analysis are to also include the important informal rights, rules and norms (determined by society and communities, ideology, tradition, etc.) and sanctioned through social pressure and "punishment" or self-enforced by individuals.

In addition to the "externally" (socially) imposed rules of the game (Institutional Environment), which are beyond the control of individual agents, there are also a variety of private, collective and hybrid institutions (Institutions

of Governance) created by the agents themselves to manage their relationships and activities – organizational and contractual forms, professional standards and codes of conduct, etc. All of them are an important part of the institutional structure and has to be identified and analyzed.

Institutions "govern" and structure human activity, behavior and relationships in a certain (and predictable) way, creating a certain social order that ultimately (pre)determines the type of agrarian development and the extent to which socio-economic and environmental goals of sustainable development are achieved (Bachev, 2020).

To analyze and evaluate the institutional structure of WTP sludge utilization in Bulgarian agriculture, the methodological framework for studying the system of agrarian governance, presented in detail in other publications of the author (Bachev, 2020, 2023) is adapted. This approach is based on a more complete consideration of socio-economic, organizational, production, agronomic, technological, educational, informational, personal, etc. factors, and the aggregate (production, transaction, third party, etc.) costs in the process of WTP sludge utilization in agriculture.

The holistic analysis of the institutional structure of WTP sludge utilization in agriculture includes the following elements (stages):

- Identifying the agents involved in the process and characterizing their needs, interests, preferences, capabilities and constraints.

- Identifying the various mechanisms and forms that govern the activity and behavior and relationships of agents (regulatory environment, public programs, organizational forms, contractual agreements, informal institutions, etc.), and assessing their potential, incentives, costs and constraints for sustainable utilization of sewage sludge in agriculture.

- Assessment of the results of modernization of the specific institutional structure of the WTP sludge utilization in agriculture and the (evolution of) the impact on the behavior, activity and relationships of the interested agents.

- Identification of the existing problems and challenges in the utilization of sewage sludge in agriculture (imperfections and "failures" in the institutional structure), and the opportunities for improving the institutional structure in the modern conditions of development of the sector. Justification of recommendations for the improvement of public policies and forms of intervention and of

the management strategies of the interested agents to improve the efficiency and the degree of agricultural utilization of sludge.

The study is based on a qualitative analysis of the specific regulatory framework and institutional structure associated with the utilization of sludge in Bulgarian agriculture, and on the results of surveys conducted during 2020-2023. with managers and experts of Wastewater Treatment Plants (WTP), representatives of Regional Environment and Water Inspections (REWI), interested parties, and farmers using and not using sludge in Sofia and Burgas regions. Nearly half of the country's total amount of sludge is formed in the two studied regions (IEA, 2021). In addition, the WTPs in Sofia and Burgas are designated as model (together with Blagoegrad and Veliko Tarnovo) in the National Strategic Plan for the Management of Sludge from Wastewater Treatment Plants in Bulgaria for the period 2014-2020. (NSPMSWTPB, 2014). According to official data, the largest share of the total sludge used in agriculture in the country is utilized in the Sofia region, reaching 95% in 2021 (EEA, 2021). In the later region eight farmers have been utilizing sludge from WPT in recent years and indebt interviews were carried out with the most experienced among them.

To evaluate the specific institutional structure of WTP sludge utilization in Bulgarian agriculture, a system of criteria is used to characterize the quality and costs of its principle components (Table 5.1). For example, when analyzing the quality of the institutional environment, one should assess the compliance of the country's regulations with the EU legislation, the degree of clarity and familiarity by the interested agents, the degree of actual implementation in "Bulgarian" conditions, the degree of stimulation and limitation of the behavior and activity of interested agents, degree of support from existing informal rules and institutions, "institutional" (for modernization and implementation of the regulatory framework), production, transactional, etc. costs to the participating agents and society as a whole, and efficiency in terms of potential created and utilization rate of the generated sludge in the country's agriculture. The evaluation of the forms of public interventions is to be based on their compliance with the contemporary needs of the country (for example, implementation of EU policies, correction of cases of market and private failures, etc.), aggregate (public, private and social) costs for their development and implementation, and the aggregate (social, economic, environmental, etc.) effects of the specific intervention. To evaluate market and private forms, the following criteria have to be used: variety of modes, degree of competi-

tion (many participants and forms), incentives and constraints for interested agents, aggregate (production, transaction, third party, etc.) costs, and effectiveness (socio-economic and environmental effects, potential, failures, etc.).

Table 5.1. *Criteria for evaluating the institutional structure of WTP sludge utilization in Bulgarian agriculture*

Institutional Environment	Institutions of Governance		
	Public	Market	Private
Compliance with EU legislation Clarity and comprehensibility Practical applicability Incentives and constraints Supporting informal institutions Costs Efficiency	Matching intervention needs Costs Efficiency	Incentives and constraints Degree of competition Costs Efficiency	Variety of forms Incentives and constraints Costs Benefits Efficiency

Source: Authors

3. Evolution of the institutional environment and public forms

Like other European and developed countries, effective waste management in general, and sewage sludge management in particular, is an important institutional modernization in Bulgaria[6]. Important factors for these fundamental changes in the country in the last two decades are the adaptation and implementation of the overall (including environmental, etc.) legislation of the EU, the "introduction" of the concept (and ideology) of "(ecologically) sustainable development" and its institutionalization in official, professional and private policies and behavior, and "proven" by science potential for sludge utilization in agriculture, land reclamation, energy, etc. areas. As a result of this radical

6 The institutional environment for modern eco-governance in Bulgaria began to form in the country's pre-accession period to the EU and continues to improve as a result of external (European control and sanctions for non-compliance) and internal (political, interest groups, etc.) pressure and actions.

development, in recent years there has been a significant increase in WTP sludge in various regions of the country and the "necessity" of their utilization, including as fertilizer (and soil improver) in agriculture (Bachev & Ivanov, 2021). In this sense, there is a challenge in Bulgaria and a "new" stage of institutional modernization is underway to "manage" the process of turning sludge from waste into a good (product)[7]. Important driving forces of this process are both the initiatives "from above" of the state (legislation, regulations, public intervention, etc.) and decentralized private and collective actions "from below" of interested businesses, farmers, interest groups, scientific organizations, local communities, etc.

The main agents and relationships in the modern institutional structure of the WTP sludge utilization process in Bulgarian agriculture are presented in Figure 5.1.

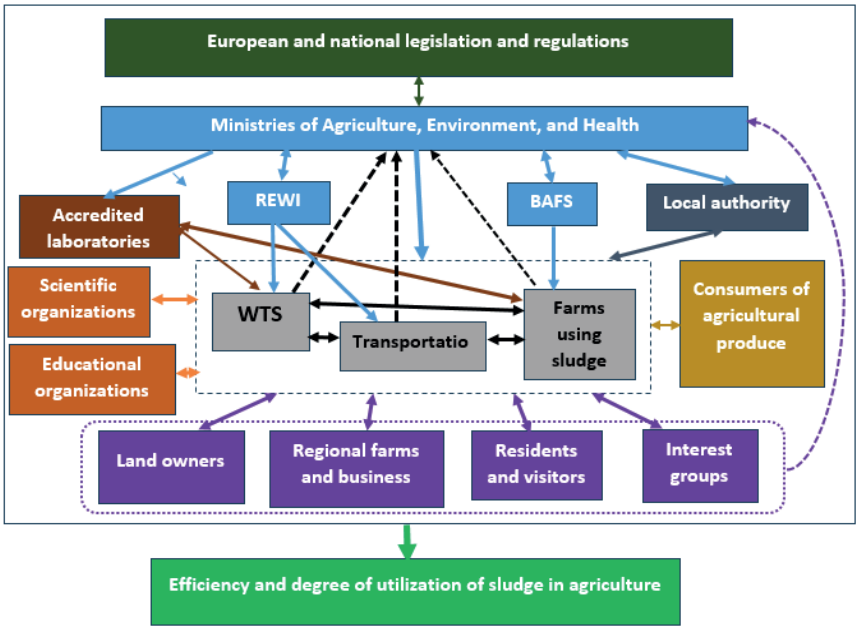

Figure 5.1. *Institutional structure of the WTP sludge utilization process in Bulgarian agriculture*

Source: Authors.

7 Both "waste management (WTP sludge)" and "waste utilization management (WTP sludge)" are part of a new scientific discipline and social practice - "circular economy management".

The formal institutional environment includes the specific legislative and regulatory provisions and the system for their enforcement, which regulate the rights, ways, processes, and control of agricultural sludge utilization in Bulgaria. One of the most important factors for the effective utilization of sludge in agriculture is the availability of modern legislation and regulations (Bashev & Ivanov, 2021). It has to define the rights and obligations of the various agents involved in the process (regulatory and control bodies, WTPs, farmers, laboratories, etc.), standards for quality and safety of sediments, soil quality and human and animal health, norms and limitations of application, etc. The institutional framework also includes a variety of state policies, programs, plans, and incentive tools to achieve certain social goals regarding the utilization of sludge in agriculture and other sectors of economy.

With well-defined "rules of the game" and adequate state intervention, conditions will be created to induce the effective behavior of the main agents and effective (and not only) utilization of sludge in agriculture (maximizing positive effects and minimizing negative effects). Conversely, inefficient regulation (for example, complex procedures and high costs of obtaining permits for use by farms) there will be no the interest to participate in the process.

In the European Union, the formal institutional regulation of the utilization of WTP sludge in agriculture has a long history, established in 1986 with the EEC Directive (Directive 86/278/EEC, 1986). The Directive encourages the use of sludge in agriculture, only on the condition that it is used in areas where it does not have a negative impact on the soil and agricultural products. The main requirements in the Directive come down to compliance with limits related to the content of heavy metals and biogenic elements in sediments and soils, as well as restrictions on the annual norms of utilization of sludge on agricultural lands. Mandatory treatment of sludge before its use for fertilization is also decreed.

In addition to this specific regulation, there is a huge legislation in the EU related to the protection of the environment (water, air, biodiversity, climate, comfort of the population, etc.), which is constantly being developed and refined for better conservation of natural resources and biodiversity, and protection of human, plant and animal health. A detailed presentation and analysis of the evolution of European legislation and court decisions concerning the use of sludge in general and in agriculture in particular is made in NSPUS (2014). This constantly modernizing legislative framework regulates the behavior, ac-

tivities and relationships of the diverse agents and stakeholders involved in the WTP sludge utilization process in the sector.

Individual EU countries also have specific policies and different "social tolerances and restrictions" regarding the use of sludge in agriculture. New concerns related to the spread of the Coronavirus-19, for example, have led some countries such as France to regulate mandatory disinfection of sludge before its use in agriculture (ANSES, 2020). As a result, the rate of sludge utilization in agriculture in EU countries varies widely, from almost zero in Malta, Slovenia and Slovakia to 80% in Ireland (EU, 2016). There are no official statistics on the number of agricultural holdings utilizing WTP sludge in Bulgaria, but our study found that at the current stage, a small proportion of farms use WTP sludge (Bachev *et al.,* 2021).

The requirements of the European Directive for the protection of the environment when using sewage sludge in agriculture have also been introduced into Bulgarian national legislation through a number of normative documents, the main one of which is the Ordinance on the procedure and method for the utilization of sewage sludge through the use in agriculture (Regulation, 2017). This document was originally adopted in 2004 (PMS No. 339 of 14.12.2004, promulgated, SG No. 112 of 23.12.2004), and a number of progressive additions and changes to the regulations were made in 2011 (SG, No. 29 of 08.04.2011), 2016 (SG No. 63 of 12.08.2016) and 2017 (No. 55 of 07.07.2017).

The Ordinance determines the procedure and method for the utilization of sludge from sewage treatment plants and wastewater treatment facilities through their use in agriculture; the requirements for producers and users of sludge intended for utilization in agriculture in a way that ensures that their application will not have a harmful effect on the soil, vegetation, animals and humans; the procedure for accounting for unitized sludge; the permit regime for the use of sludge from the WTP; and methods for sampling and testing sediments and soils (Ordinance, 2017).

According to the regulations, "users of sludge" can only be sole traders and legal entities. The Ordinance does not allow the utilization of sludge on: meadows, pastures or areas sown with fodder crops, when they are used for grazing or the fodder is harvested within a period shorter than 45 days after the use of the sludge; soils on which fruits and vegetables are grown, with the exception of

fruit trees and vineyards; soils intended for the cultivation of fruit, vegetable and other crops that are in direct contact with the soil and are consumed raw, for a period of 10 months before and during harvesting; coastal floodplains, riverbeds and protective dikes; zone I and zone II of the sanitary protection zones of the water sources and facilities for drinking and domestic water supply and around the water sources of mineral waters used for medicinal, prophylactic, drinking and hygiene purposes; and in agricultural lands in protected areas.

The utilization of sludge in agriculture is allowed on the basis of a permit. For the issuance of a permit, sludge users provide the Bulgarian Food Safety Agency (BFSA) with information and results of analyzes of the soil from the plots where the sludge will be used, about the soil characteristics: soil type, bulk density, granulometric composition of the soil, and total soil porosity. The taking of the samples and their subsequent testing is carried out by accredited laboratories according to certain indicators. Soil testing is mandatory before the initial utilization of the sludge, and after its use - every 5 years. The permit contains: the quantities of sediments meeting the requirements for the MPC of heavy metals in the sediments expressed in tons of dry matter, which can be introduced annually into the soil per unit area; the location and size of the area on which the sludge will be utilized. The permit is issued for a one-time import of a certain amount of sediment for a specific area.

The bodies related to the implementation of the Ordinance and controlling its implementation are a principle elements of the institutional structure. The control over the implementation of the regulation is entrusted to the Minister of Agriculture, the Minister of Environment and Water, and the Minister of Health according to their competences. In reality, these functions are performed by the specialized agencies and divisions of these ministries, whose functions are described in detail in the normative documents. Main among these organizations are REWI and BAFS, which issue permits (licenses) and control, respectively, the “production” and quality of sludge for agricultural utilization (REWI) and the use of agricultural sludge (BAFS).

Normative requirements for the management of sewage sludge are also contained in other official documents, the main part of which are related to waste and water management legislation. Important elements of the institutional structure of the utilization of sludge in agriculture are: Ordinance No. 1 on the order and samples according to which information on waste activities is provided, as well as the order for keeping public registers (Official Gazette

No. 51 of 20.06 .2014, amended by SG No. 51 dated 19.06.2018, amended and supplemented by SG No. 51 from 28.06.2019, amended and supplemented by SG No. 30 from 31.03.2020); Ordinance No. 2 on waste classification (SG, No. 66 of 8.08.2014, amended and supplemented, No. 32 of 21.04.2017, No. 46 of 1.06.2018, No. 86 of 6.10 .2020); Law on Waste Management (Official Gazette No. 53 of 13.07.2012, amended and supplemented by Official Gazette No. 19 of 5.03.2021), Ordinance on Separate Collection of Bio-Waste and Treatment of Biodegradable Waste (Official Gazette No. SG No. 47 of 05 June 2018), Law on Soils (SG No. 89/2007, last amended by SG No. 66 of 26.07.2013), Law on Protection of Agricultural Lands (SG No. 35/1996) ., last amended by SG No. 66 of 26.07.2013), Water Law (SG No. 67/1999, last amended by SG No. 26 of 21.03.2014), Ordinance No. 6 on emission norms for the permissible content of harmful and dangerous substances in wastewater discharged into water bodies (SG No. 97/2000, last amended and supplemented by SG No. 24 of 23.03.2004), etc.

It can be concluded that Bulgaria has a modern legislative and regulatory framework for the safe use of sludge in agriculture, which is based on modern European standards. It creates a certain order and standards for the utilization of sludge from WTP in agriculture, determines licensing and controlling bodies (REWI, BFSA, etc.), accredits laboratories for testing samples of sediments and soils, regulates and limits the use (permits for doses and areas) and the users (sole traders and legal entities) of sludge from wastewater treatment in agriculture.

In-depth scientific experiments, including in field production conditions, of leading scientific institutes of the Agricultural Academy (SSA) like Soil Institute “Pushkarov”, Bulgarian Academy of Sciences (Institute of Microbiology), and the Ministry of Health (National Center for Public Health and Analyses), Agrarian and other universities have repeatedly proven the agronomic and economic value and the ecological and medical safety of the utilization of sludge in agriculture (Marinova, 2008). However, in the period until the adoption of modern regulations (up to 2005), there was practically no use of sludge in Bulgarian agriculture (EEA, 2005). Therefore, the introduction and implementation of modern legislation in the country is an important factor for the induction and expansion of the process of sludge utilization in agriculture.

In 2006 already 22,520 tons of dry matter sludge is utilized in agriculture, which represent the largest part of the total sediments formed in the country -

61% (NSPUS, 2014). For the period 2004-2010 nearly half of the amount of sludge generated in the country (49%) has already been utilized on land either for reclamation or for agricultural areas (NSPUS, 2014). After the introduction of the legislation, the share of sludge utilized in agriculture progressively increased from 31% (for the period 2006-2010) to 36% (for the period 2011-2015) and reached 48% for the last years (for the period 2016-2021) (EEA, 2004-2021).

In order to bring it into line with European standards after the country's accession to the EU, a National Strategic Plan for the management of sludge from wastewater treatment plants in Bulgaria for the period 2014-2020 was adopted. (NSPUS, 2014). This Plan envisages the recycling and material utilization of 70% of the total generated sludge from the WTP by the end of 2020 and zero landfilling and non-targeted temporary storage of sludge by 2020. For the implementation of the Plan's objectives, a number of interventions are undertaken at the national level: establishment of an institutional framework for sustainable management of sludge (this includes an institutional structure at the level of competent authorities, as well as agreements with farmers and potential users of sludge); establishment of a legislative framework - regulatory provision by amending and supplementing normative documents in the national legislation; providing a sufficient database for sludge management planning using the chemical analyzes of sludge from all WTPs and from soil carried out by accredited laboratories and managed by an independent organization; creation of a qualified system for utilization of sludge in agriculture by 2015 in the context of the need to determine threshold utilization norms in agriculture (3.5t per hectare per year, proposed as a maximum); drawing up a professional profile and training program for workers in the WTP; creation of a monitoring and control system (ISO 9001, EMAS, ISO 14001, ISO 18001), etc.

In recent years, significant European and national funds have been invested for the modernization of WTPs in the country. However, until now, CAP instruments and public funds have not been used to financially support the utilization of sludge by agricultural producers and other agents (transport companies, intermediaries, collective organizations, etc.) of this chain. The lack of social recognition, integration into CAP and financing of this important ecosystem service "waste utilization" is one of the reasons for the slow progress of WTP sludge use in Bulgarian farms.

In addition, institutional requirements and restrictions, and standards for quality and safety of food and feed, protection of the natural environment and biodiversity, animal welfare, etc. in the EU and Bulgaria are constantly developing and "tightening", including the control for their strict compliance. This modernization also affects the monitoring and control system, and is closely "linked" to the support of farmers with the CAP tools - cross-compliance, eco-payments, eco-contracts, overall "greening", etc. At the same time, social tolerance of farm sludge use in the country shows no trend of progress due to actions of environmental interest groups, consumer organizations, affected or at-risk businesses and local communities, etc. The dominant "outdated" treatment of WTP sludge as waste and not product for subsequent effective use in agriculture, in regulatory documents and by responsible public agencies and those working in them, also contributes to this problem.

Moreover, the newly adopted Green Deal by the European Union in 2019 sets ambitious targets for reducing greenhouse gases, limiting the use of mineral fertilizers and pesticides, and increasing the area of organic production by 2030. (The European Green Deal, 2019). In the EU countries and in the governing bodies of the Union, discussions still continue and the procedures for the implementation of these goals are being developed by means of the CAP instruments, the Strategic Development Plans until 2030, and other policies and mechanisms. In this regard, there is considerable ambiguity and "institutional uncertainty" on many issues concerning the achievement of European and national targets, and in particular how the reduction will be distributed between the individual member states of the union, sub-sectors of production, agrarian and agro-ecological regions and types of agricultural producers, whether and how the general reduction will also include the use of manure and sewage sludge, what resources will be directed to support critical areas and for green transformation of industries, areas, activities, etc. The development of incentives for agents in the chain and the degree of use of sludge in agriculture in the coming years will largely depend on the solution of all these questions.

The main public agents in the institutional structure of sludge utilization in the country are REWI, BAFS, laboratories for testing samples, scientific organizations, local government, etc. Their capacity for and effectiveness in implementing the regulatory framework is an important factor in accelerating the process of sludge utilization in agriculture. After the country's accession to the EU, the competence and degree of implementation and control of the procedures,

standards and restrictions for the use of sludge in agriculture by the competent state authorities has significantly improved, especially in the last few years. The local authority has an active role in the overall activity in the area, and significant differences are observed regarding the use of sludge in agriculture - from complete denial (in the Black Sea coastal resort areas of the Burgas region) to complete tolerance (in the Sofia region, where the agents in the process create jobs, hire resources or provide services to the local population).

However, the administrative capacity of the responsible organizations in different regions of the country is not the same and completely adequate, due to insufficient personal and financial resources, experience, training and staff turnover, frequent organizational and personnel changes, changing and even absence of political support, etc. As a result, there is an uneven understanding and application of the regulations by different individuals and organizations in different public agencies and regions of the country.

In addition, these hierarchical type organizations demonstrate all the shortcomings of public bureaucracies such as: lack of interest, initiatives and orientation to the real problems of practice, low adaptability, high costs and time for making and implementing managerial decisions, etc. Moreover, in recent years, the efficient utilization of sludge has not been among the many "major" socio-economic and environmental problems and, therefore, of primary public and political interest and priority. This made it much more difficult to improve and implement the regulatory framework, and to improve public support through various programs, tools, public-private partnerships, etc.

In general, frequent changes (additions, amendments, etc.) in the regulatory framework create difficulties for study and implementation by both civil servants and other interested parties (WTP, farmers, interest groups, etc.). Moreover, the practical study, implementation, compliance and control of regulatory standards and restrictions is associated with significant personnel, capital and running costs. Very few (large, financially and organizationally secured) WTPs, transport companies, agricultural holdings and other businesses have the capabilities (potential, expertise, finances, etc.) to adapt to modern mandatory standards and requirements for modern transformation, transportation and utilization of sludge.

Most of the public interventions (and forms) impose constraints and create costs for the various agents along the chain, while public measures for direct

(financial, logistical, etc.) support are negligible or absent. Moreover, a new long-term state strategy for the current program period has not yet been developed and adopted reflecting new needs, contains and measures to overcome identified in the old strategy and newly emerged challenges, and adapting likely scenarios for agricultural development and potential for the possible utilization of sludge in agriculture and other sectors of the economy in the medium term.

Another well-known fact is that during the years of the country's membership in the EU, there are many examples of incomplete, distorted and in a "Bulgarian way" implementation of the common policies of the Union. Moreover, there is no long-term and mass experience in the use of sludge in agriculture in the country, and almost all agents are outside or at the beginning of the "knowledge curve". This leads to unconscious errors in implementation and/or search for "effective" practical solutions outside the normative framework, etc. In addition, many of the eco-activities and eco-standards in agriculture and related fields are difficult to be effectively controlled by enforcing bodies, due to high cost or practical impossibility (Bachev *et al.* 2021). This is related to the well-known "massive" non-fulfillment of certain official eco-standards and norms, etc. and the uneven application of the procedures in different regions of the country, sub-sectors of agricultural production, agro-ecosystems, and individual agents of the sludge utilization chain.

State regulatory and supervisory bodies are the main agents in the system. They implement the provisions of the legislature and the policies that the Government and the Parliament undertake. One can only assume that (like other government structures) mistakes are likely to be made, due to lack of experience in this "new" field, poor management, and incompetence of those employed. In addition, corruption is possible, as is the practice in all cases of issuing permits, control of certain practices and standards, etc. There are probably also cases of overt or hidden "conflict of interest" of heads of these units who are also interested parties. The same applies to some of the accredited laboratories, which perform important public functions, but are "small" in number private structures aimed at profit or (divisions of) underfunded public organizations, and their activity is not always in accordance with the regulatory framework (imprecise tests, buying and falsifying test results, etc.).

Apart from the regulating and controlling authorities, the main agents of the system are WTPs, transport companies and farmers using sludge. The re-

lations of WTPs, transport organizations and sludge utilization farms with the state bodies are of "unilateral" dependence. Application is voluntary, but permits are "granted", and this involves lengthy procedures, time and labor costs, sediment and soil samples testing costs, etc. In addition to permits, other parameters of the process are determined (restricted) - used technology, mandatory standards, time periods, prices, etc.

Control over the implementation of (various aspects of) regulatory provisions is divided between many structures in the system of the Ministry of Agriculture, the Ministry of the Environment, the Ministry of Health, etc. This complicates coordination between them, duplicates activity, and often creates difficulties for other participants. At the same time, there is a situation of few players, and the agents "know" each other well, which should facilitate relationships in the interest of "common" efficiency. This situation often contributes to the easy development of "personal ties" and (private) "coalitions" that are detrimental to the effective implementation of the regulatory framework. A major problem identified by the current study is the slow issuance of new permits by government authorities. In addition, the one-time licensing of main agents in the chain (such as WTPs for sludge production, transport companies for sludge transportation, etc.) and the infrequent (often only on received signals) control do not contribute to the effective maintenance of the quality standards envisaged in the regulatory framework.

In addition, the high asymmetry of information between the interested agents (the state, WTP, farmers, consumers, etc.) provides a great opportunity and creates incentives for non-fulfillment (violation) of the requirements of the regulatory framework, both by WTPs and by sludge-utilizing agricultural producers. So, for example, it is often practiced to provide farmers from WTPs, transport, and bring to agricultural lands incompletely treated sludge, apply higher than the allowed rates of sludge per unit of agricultural area, apply sludge also on unauthorized agricultural plots, and/or sludge is not applied in the prescribed manner (with simultaneous burial), etc. All this is associated with a number of risks and negative effects in terms of the cleanliness of roads, soil, water and air, the health of farm workers, consumers of the farm products, etc.

The contradictions and conflicts of the interested agents (and the individual, economic and social effects) in the process necessitates the development of a special system for the management and control of sludge utilization in

general and in agriculture in particular. This is associated with additional costs for individual agents and society as a whole (taxpayers) - for maintaining state bodies, for studying and complying with the regulatory framework, for taking soil samples, for obtaining permits, for relations with state institutions, etc. The introduction of a system of permits and control is also associated with the development of "dependency relations", as well as the possibility of unauthorized payments (and corruption) for quick and/or illegal obtaining of permits, for understated or ineffective control of the implementation of legal norms and restrictions, and as a result of insufficient or ineffective utilization of sludge in agriculture. Our study also found that there are also "conflicts of interest" as managers and experts of WTP are simultaneously interested farmers.

The degree of actual non-compliance with regulatory restrictions in the country as a whole is difficult to assess, since the agents involved are not interested in sharing this type of information, and the exact "measurement" of this type of effects is impossible to carry out by third parties (researchers, independent experts, etc.).

Scientific research in this "new" field has been episodic, underfunded, unrepresentative, on a small-scale and merely on experimental plots, with "ideal" instead of real samples, and without the involvement of sludge-producing and transport organizations and sludge-using farms (high distrust, lack of interest, reluctance to publish the results, etc.). Moreover, systematic inter- and multi-disciplinary research is rarely carried out, combining the efforts of experts working in this field from different organizations (SSA, BAS, universities, etc.) in order to completely evaluate the achievements and reveal the diverse challenges.

An important factor for increasing the utilization of sludge in agriculture is the availability of versatile, up-to-date and reliable information about the opportunities, ways, conditions, effects, challenges and risks related to utilization of sludge in agriculture. Adequate normative, scientific, experimental and practical information is important not only for farmers, but also for all other participants in this process – government bodies and employees, WTPs, farmers, interested parties, end users and the general public.

This research found that such information in Bulgarian (only available to the majority of agents) and about the specific conditions of the country and its individual regions is very scarce and often contradictory. Very few publicati-

ons are widely available, mostly in little read by farmers, business, the general public, etc. academic publications that are mainly based on experimental and laboratory experiments, most often presented in a foreign language. For example, a Google search can turn up a small number of publications in recent years by a limited number of authors. Episodic information may appear in the media, mainly about regulatory documents or publications induced by interested parties.

Moreover, comprehensive assessments of the real socio-economic and co-effects of sludge utilization among farmers of different types, specializations and locations are virtually absent. Furthermore, the results of published scientific, experimental and laboratory trials and tests are based on ideal conditions (optimal agricultural techniques, correct fertilization rates, good management, etc.), which differs significantly from real farm practice. So, for example, the experiments are done with perfectly treated sludge, while in practice the sludge is often delivered and imported in a state different from the normative requirements – not treated or partially treated, with increased humidity, etc.

The survey found that many farmers are partially aware of the possibility of sludge utilization, but there is a strong lack of information about the necessary conditions, potential effects, risks, costs, etc. The lack of adequate information on these issues also negatively affects the attitudes of the population, producers in the area, and intermediate and final buyers of the farm products. The information deficit is most often "filled" with false information about the possible effects of agricultural utilization and resistance from both farmers and other interested parties.

In some scientific institutes of the SSA and other institutions there are long-term studies of the chemical-biological and agronomic effects of the use of sludge in agriculture. However, the scope and nature of these studies do not correspond to the modern needs of farmers and society. There are no interdisciplinary studies devoted to this important problem. There is a lack of independent tests and demonstrations, and promotion of practical sludge utilization in experimental or farm settings, and specific guidelines for optimal application in farms of different specialization, size, ecological and geographical location, etc.

The country still lacks reliable information on the quantity and quality of the formed sediments and their utilization in agriculture. There are huge disc-

repancies between the figures in different "official" sources and in general inaccuracy in the actual and estimated data on the amounts of sludge generated, treated and utilized in Bulgaria (NSPUS, 2014). It is often even difficult to use officially available information - for example, the 2017 and 2020 reports of the EAA on sludge utilization are unavailable, many official documents and assessments are not published, etc. With few exceptions (Ivanov *et al.,* 2021; IAI, 2021; Marinova, 2008; Syarov, 2020; Ivanov & Bachev, 2021), in-depth assessments and studies of the diverse benefits, effects and critical factors of sludge utilization in agriculture are also missing. There are also no assessments of alternative and hybrid forms of utilization of WTP sludge in different conditions. It is well known, for example, that in the long-term other alternatives for sludge utilization are to be sought, such as co-composting with bio-waste, bioenergy production by self-incineration of sludge and additional phosphorus use from the ash or directly during the liquid phase in GPSOV (NSPUS, 2014).

Official estimates show that the utilization of sewage sludge in the non-food sector of agriculture will not have problems related to land shortages, even in a scenario of significant reduction of sludge utilization rates per hectare (NSPUS, 2014). However, there are no institutional guarantees that the same lands will be used for the cultivation of non-food crops in the future, and therefore no reliable assessments of the risk of permanent soil contamination.

All these information problems do not allow informed decisions to be made by the different agents and at different levels of management, and creates mistrust and resistance to the expansion of the sludge utilization process in agriculture and other sectors of the economy. The information vacuum of public sector failure is often filled with incomplete, contradictory or unreliable information in the media of various kinds from incompetent or private sources, and in private, group or corporate interest.

The utilization of sludge in agriculture is a complex and dynamic process that also requires long-term specialized training and counseling of farmers. Our research found that there is no specialized training and consultation dedicated to the utilization of sludge in agriculture in the country. For example, there are no highly qualified experts and courses for long-term training and counseling of interested farmers in the Agrarian and other universities, SSA and National Agricultural Advisory Service. Some farmers also indicated that they "don't trust the native institutes" and therefore do not seek their services.

All this greatly complicates the effective transition to the utilization of sludge in agriculture.

Some of the farmers using sludge in agriculture conduct their own experiments, find their own solutions and/or seek and find the necessary information and training, including abroad. Some of them consult each other, exchanging experience and useful information, or seek external advice from private consultants, WTP experts, scientific workers, etc. At the same time, depending on personal qualities (management experience, qualification, innovativeness, etc.), self-learning or "learning through experience" requires different time and gives different results for individual farmers, and in some cases can lead to incorrect or inefficient use of sludge, and not infrequently even the refusal to use sludge in farms.

However, our study found that most of the sludge-using farmers are reluctant to share their experiences for various reasons – lack of time, reluctance for publicity, company secrecy about yields and profits from competitors, etc. An important reason for this is also that they do not want new farmers to increase their interest in using sludge, as this will increase the demand in the area, increase the "price" and reduce the "profitable" access to the limited resource "sludge". This further slows down the spread of this new practice in the country.

4. Private initiatives and modes

Main private agents involved in the utilization of sludge in agriculture are the organizations in the chain – WTPs (producing sludge), transport companies (transporting sludge from WTPs to farms) and agricultural producers using sludge. In addition, landowners, farmers and businesses in the area, residents and visitors to the region, traders, processors, end users, interest groups, etc., also occupy an important place in the institutional structure. (Figure 5.1). An important component of the analysis of institutional structure is the interests and incentives of the agents involved and the nature of their relationships.

The relationship between WTPs and user farmers is contractual, based on one-year or multi-year private agreements. Like all contracts, the parties are "free" to specify (negotiate) the terms of exchange and terminate their relationship in the absence of interest. In practice, however, there is a lack of a free market (many participants) of sludge for utilization, dominated by regional

monopolies in the production (WTP), and a small number of potential carriers (for specialized transport) and end users - only farms with the status of sole traders and legal entities (cooperatives, corporations, etc.). Moreover, each of the participants in the chain has to be licensed by a competent state authority to guarantee the public interest (obligatory permits for treatment, transport and agricultural utilization of sludge).

Therefore, there is a typical hybrid organization with the participation of a third party (the state) in licensing and controlling the transaction agents and a number of technological characteristics (precisely defined areas and volume of sludge application in the licensed farm) of the transactions. Moreover, many of the characteristics that the product must meet and the method of its utilization are (pre)determined by the regulations. By means of the private contract between the WTP and the farmer, the "right to utilize treated waste - sludge on areas cultivated by the farm authorized by a competent state body" is transferred. Very often, the right to agricultural utilization is provided "bundled" with services from the WTP - for example, "arranging a permit for the use of sludge", transporting the sludge, and spreading the sludge on agricultural lands, etc.). Sludge is usually provided to the farmer free of charge, with the user only paying the fuel costs for transportation and spreading (example in Sofia region). The absence of price and payment for the sludge is an expression of the mutual benefit of this non-commercial (non-monetary) exchange.

In principle, all WTPs should have an interest and developed strategies for effective management, and in the modern stage for effective utilization of sludge. When the amount of sludge formed is significant, this makes technologically modern and economically advantageous treatment possible and opens up the possibility of alternative utilization (instead of landfilling and incineration). The incentives for WTPs to provide sludge to farmers free of charge are a strategy for long-term corporate development, public relations (positive eco-image, lack of dissatisfaction from the local population), strong public pressure, lack of landfill sites, and also significant savings on costs for disposal, destruction, alternative use, payment of sanctions for violations of the regulatory framework, etc.

The benefits for farmers utilizing sludge are multiple positive economic, agronomic, production, ecological and other effects, presented in detail in another publication of ours (Bashev and Ivanov, 2021). Our study found that all sludge users are large producers who have a strong interest in minimizing

the costs of chemical fertilization and have the capacity to bear the additional costs of "external" relationships with WTPs and government authorities, experimentation, training, reorganization of the production process and management, risk taking and potential losses, etc. necessary for the agricultural utilization of the sludge. The introduction of sediments into agricultural lands requires a change in farming techniques, and a new better organization and management of production, which is the reason why it is mainly undertaken by innovative agricultural entrepreneurs.

Even when the transportation is carried out by a specialized (market) agent, for example a transport company, this must necessarily be preceded by the licensing of the chain agents and the conclusion of a contract between the WTP and the farm using the sludge. In this case, a price for the (transport) service is negotiated, which is paid individually or jointly by the WTP and/or the farmer using the sludge. In view of the great potential for business expansion, a transport company in the Burgas region has been making great efforts to increase the agricultural utilization of WTP sludge, including by lobbying for supporting agricultural producers through the CAP measures.

At first glance, there is a (quasi) monopoly situation in the contractual relations between the WTP and the sludge utilization farms. However, our research found that these relationships are of "mutual" (symmetric) dependency - capacity, location, time, etc. due to high transportation costs and other restrictions. The agricultural utilization of sludge in the country is at an initial stage, and the assets of the WTP for treating the generated sludge and the resulting "product" appear to be partially or completely highly bilaterally dependent on the assets (agricultural lands with received permits) of the user farms in the area. The degree of this dependence is determined by the amount of sludge for "agricultural" utilization, and the (limited) number of permits for the use of sludge on certain farmers' land. There is often a strong bilateral dependency between the production of sludge and its transport to the farm by specialized transport. This is the reason why some large WTPs integrate these assets and activities and realize economies on transport and transaction costs (as is the case in Sofia region).

High symmetrical dependence is the basis for the development of long-term relationships between the same partners. Our survey in the Sofia region confirmed that most of the farms using sludge have been doing so for a long period of time, reaching in some cases up to two decades. Long-term coope-

ration between the same partners promotes good familiarity, development of trust, willingness for cooperation, restriction of opportunism, sharing information, and creation of mechanisms for coordination and conflict resolution, and minimizing transaction costs. This further facilitates relationships, reduces associated costs, and increases the efficiency of sludge utilization in agriculture.

Along with the economic benefits for farms, sludge utilization comes with additional costs for dealing with WTPs, regulatory bodies, soil sampling, etc. For example, contracts between WTPs and farmers are not comprehensive, require additional costs to coordinate and overcome potential conflicts, etc. Imperfect contracts also allow for unilateral "violation" of the agreement by the WTP at the expense of farmers - untimely delivery, supplying sludge in different quantity and quality, temporary suspension of supply to appease public discontent, etc. In addition, WTPs usually apply standard contracts not adapted to the conditions of specific farms. This further increases the costs in the sludge utilization process of adaptation, coordination between partners, contestation, etc.

The widely applied practice of one-year land rent agreements of large farms with numerous (hundreds and even thousands) of landowners also creates an additional risk of losses (e.g. one-time long-term investments related to the supply and use of sludge), in case of refusal to renew the rent-contract by of the land owner on areas with sediments or permits, during the new agronomic season (alternative use, sale, provision to another tenant, reluctance to deposit sediments, etc.).

On the other hand, (profit-oriented) WTPs also seek to minimize their costs for agricultural sludge utilization and prefer as counterparties large farms in the vicinity of sludge landfills - savings in negotiation and relationship costs, obtaining permits (no fees on the "paperwork" and the wait is long), soil samples, to transport sediments, etc. In all cases where the transaction costs for farmers and/or WTPs are very high, the agricultural utilization of sludge is reduced or completely blocked, regardless of the potential (production, economic, etc.) benefits for both parties. For example, the survey in the Burgas region found that a large farmer who used sludge in the past stopped this activity due to high costs for permits, soil samples and transport.

In the future, the effectiveness and incentives for the application of sludge instead of mineral fertilizers in agriculture will depend strongly (in direct pro-

portion) on the price dynamics of mineral fertilizers of different types (mainly N and P, the substitute of which is sludge). In addition, interest in the use of sludge may increase with mandatory or voluntary (against receipt of public subsidies) restriction of the use of mineral fertilizers in certain regions, industries or farm types in the EU. An important limiting factor is the institutional uncertainty related to the implementation of the Green Deal, the evolution of public tolerance, and the development of markets and consumer attitudes.

Some WTPs plan to sell the sludge to interested farmers in the future, for example in the Sofia region. In this way, sludge supply contracts will be commercialized and converted into "product (sludge) purchase and sale" contracts, with a price paid by the farmer or other intermediate wholesale buyer for the transfer of the "right to utilize".

However, many of the farmers surveyed felt that if the sludge was not provided for free but sold as a fertilizer product, this would further limit its agricultural use. There is no market for a similar product in the country, and the supply will be monopolistic (single supplier) in the relevant WTP areas. At the same time, this product is not highly farm-specific, as there are many alternatives among other (mineral, manure, etc.) fertilizers. Moreover, the competition with and among the companies supplying mineral fertilizers is high, and usually mineral fertilizers are sold in a "package" with additional services (credit, deferred payment, consulting, provision of seeds, etc.). Therefore, a strong development of the "sludge market" and trading of sludge at high prices cannot be expected in the coming years. Therefore, the increased and growing costs for efficient utilization of sludge in general and in agriculture in particular will continue to be mainly covered by WTPs (and respectively by water users) and/or by public programs (respectively by European, national or local tax payers).

Other stakeholders (landowners, neighboring farms and businesses, local population, interest groups, consumers, etc.) are also involved in "relationships" with the WTP, sludge-using farmers and public authorities. However, individual agents do not have the "power" to change the prevailing practices, due to insignificant sizes of the (negative) effect on them, high individual costs and possibilities for "free riding" (one invests costs and all benefit if action is successful), difficulties for common " collective actions" of agents with divergent interests, power positions of and "dependence" on the large (producing, transporting and using sludge) agents in the area, etc. Only when the effect is highly negative and direct (for example, a strong smell during the delivery and

spreading of sludge) are practically possible strong collective actions of the population in the area, which often lead to the cessation of sludge supplies for short periods of time (before their resumption after this).

Most often there is a psychological barrier, due to the "special nature" of this fertilizer (soil improver), both in the farmers themselves and in the landowners (leasing their land to a farm using the sludge), the residents of the area, the local farming (livestock, organic or ecological agriculture, etc.) and other interested businesses (tourism, etc.), interest groups (ecologists, healthcare, consumer protection, etc.) about the potential negative effects of using sludge in agricultural lands on soil quality and biodiversity, and the health of plants, animals and people. These informal rules of the game and how they affect each of the stakeholders are to be thoroughly analyzed. In other EU countries, for example (e.g. Northers France, Nederland, etc.), in areas with highly developed animal husbandry and mass application of manure, there is also a higher tolerance for the application of sludge in agriculture, both by farmers and the general population.

The market and buyers are also not yet "open" to the broad application of sludge in agriculture. Many wholesale buyers and end users question the safety of produce produced using sludge. This is often associated with reduced selling prices of farm produce and high marketing costs (including fraudulently declaring the use of sludge). Last but not least, the farmers themselves and other interested parties are concerned about the long-term effects of the use of sludge on the natural environment - cleanliness and quality of soils and waters, the trampling of agricultural lands, the protection of natural biodiversity, maintaining the ecological sustainability of farms, etc.

Interested agents can and do participate in the modernization of national and European policies, including in the field of WTP sludge utilization. However, the reverse impact of these elements of the institutional structure is highly limited because the "political process" is slow, with different priorities, and not always in the interest of overall efficiency. The same applies to the direct impact of these agents on the development of product and resource markets (fertilizers, agricultural land, etc.) and the natural environment due to lack of complete information, complexity, high uncertainty, and the need for expensive and long-term collective actions of enormous proportions and scales.

According to official statistics, by 2020 one of the goals of the National Strategic Plan for managing sludge from wastewater treatment plants in Bul-

garia has been reached, as 70% of the total sludge generated from WTPs in the country has been materially utilized (EEA, 2021). At the same time, the realization of another important strategic goal "zero landfill and non-targeted temporary storage of sludge" has been significantly delayed and is unlikely to be reached in the coming years.

The impact of the institutional structure on the utilization of sludge in the country's agriculture is illustrated in Figure 5.2. The amount of WTP sludge generated in the country increased progressively in the period 2006-2016, after which it marked a significant decline. The share of utilized sludge in agriculture in the country has fluctuated significantly since 2006 - from 20% (2007) to 58% (2018). Therefore, the institutional environment and governing institutions do not create favorable conditions for sustainable and growing utilization of WTP sludge in Bulgarian agriculture. Moreover, the different regions of the country do not have the same institutional efficiency, and the majority of the sludges used in agriculture are in the Sofia region (EEA, 2006-2021). The positive experience of WTP and sludge-using farmers in the Sofia region have to be thoroughly studied and replicated in other regions of the country. It is also necessary to identify the main factors and their importance, which hinder the development of this process in the other regions of the country.

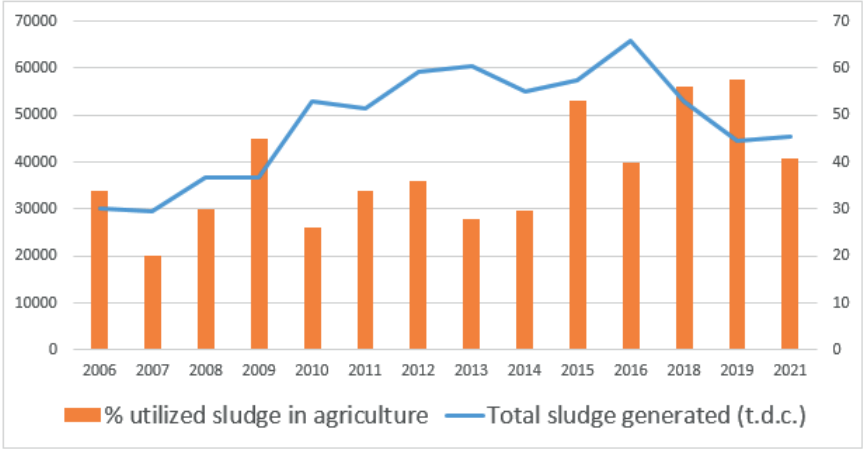

Figure 5.2. *Evolution of the generated sludge from WTP in Bulgaria and share of utilized sludge in Bulgarian agriculture*

Source: EEA

5. Conclusion

The utilization of sludge in general, and in agriculture in particular, is not automatic, but a complex process that depends on many institutional, production, economic, psychological, social, ecological, etc. factors. The specific institutional structure of this process largely determines its effectiveness and is to be thoroughly studied. This study is only the beginning of the necessary systematic research in this new and important field.

The present study found that over the last two decades, the institutional structure (regulatory framework, public, private, market and hybrid forms) of sludge utilization in Bulgarian agriculture has significantly improved. As a result, great progress has been observed in the agricultural use of sludge in the country. At the same time, however, uneven and unsustainable development of this process was found in the different regions of the country. Therefore, all factors limiting the behavior of the associated agents and leading to these fluctuations in sludge utilization are to be identified.

In view of their relevance, interdisciplinary studies and evaluations of the institutional structure and factors of sludge utilization in agriculture have to be expanded and enriched. However, for this, it is necessary to collect a new type of micro and macro information from all interested parties, including through the official system of agro-statistics in the country and the EU. In addition to identifying the critical factors influencing the behavior of agents along the chain, the degree of their significance is to be assessed and the existing failures in the institutional arrangement and the incentive system be identified. On this basis, detailed recommendations can be prepared for the improvement of public policies and management strategies of WTPs and potential and sludge-using agricultural producers to improve this process.

In view of the leading role of public intervention in this area, a new national strategy for the utilization of WTP sludge is to be developed, reflecting modern conditions and social priorities, and special measures be taken to support the interested parties, including farmers with tools of CAP. An example in this regard is the inclusion of sludge in the official list of soil improvers, the use of which to replace mineral fertilization on farms is subsidized during the current program period.

Last but not least, trends in the development of the institutional structure and the utilization of sludge in other EU countries have to be studied in order

to assess where Bulgaria is and where efforts are to be focused in the future. Every positive and negative experience in this regard has to be promoted in a timely manner in order to support the making of management decisions at different levels.

Conclusions

These studies collectively highlight the intricacies of governance in various aspects of Bulgarian agriculture and underscore the need for further research and policy interventions to enhance the sector's efficiency, competitiveness, and sustainability. Agrarian governance has been explored as a multifaceted system encompassing key components: agrarian agents involved in decision-making, the rules and mechanisms governing their behavior, the processes of governance decision-making, and the resulting social order. Employing the New Institutional Economics methodology has provided valuable insights into this complex system and its constituent parts.

The research has demonstrated the possibility of quantitatively assessing the governance system of Bulgarian agriculture, aligning it with the principles of "Good governance." However, refinement of the governance principles and their broader application in analyzing subsectors such as crop and livestock farming, as well as international comparisons, is still a work in progress. This approach highlights the need for comprehensive data collection through official agricultural statistics to support further assessments and comparisons.

Moreover, these studies introduce a fresh perspective on assessing the economic efficiency of farms by considering them as alternative governance structures for agrarian transactions. They offer a method for quantitatively evaluating the governance efficiency of individual farms, revealing critical micro-economic factors that impact efficiency across various farm types. The findings indicate that while the overall governance efficiency of Bulgarian farms is at a good level, there is substantial variation among different types, sizes, specializations, and geographical locations. Factors such as labor supply, innovations, know-how, and funding play significant roles in determining governance efficiency. A significant portion of farms operates at a low level of governance and overall efficiency, raising concerns about their sustainability.

The research further delves into the multi-criteria assessment of the competitiveness of agricultural holdings in Bulgaria. The findings indicate that while competitiveness is generally at a good level, substantial differentiation exists among holdings based on legal structure, size, specialization, and

location. Key factors influencing competitiveness include adaptive potential, economic efficiency, productivity, income, financial security, and adaptability to environmental changes. Without timely intervention, many Bulgarian farms may face an uncertain future.

Additionally, these studies explore the crucial role of agriculture in conserving and providing ecosystem services. They highlight the diversity of services provided by Bulgarian farms, including food and feed provisioning and environmental conservation. The participation and contribution of farms in this regard vary depending on specific ecosystems and agricultural subsectors. Encouragingly, the findings suggest avenues for improving and intensifying farmers' engagement in this essential activity through training, information sharing, incentives, and support.

Lastly, the research addresses the utilization of sludge in agriculture, emphasizing the complexity of this process and its dependence on institutional, economic, social, and ecological factors. It reveals significant improvements in Bulgaria's institutional structure for sludge utilization over the last two decades, resulting in substantial progress in agricultural use. However, regional disparities persist, necessitating further interdisciplinary research, data collection, and policy development. A new national strategy is recommended to support stakeholders, including farmers, in optimizing sludge utilization.

In conclusion, these studies collectively advocate for a holistic and interdisciplinary approach to understanding and enhancing various aspects of Bulgarian agriculture. They stress the importance of systematic research, comprehensive data collection, and policy improvements to promote sustainability, efficiency, competitiveness, and environmental conservation in the agricultural sector.

Further theoretical and empirical research and interdisciplinary cooperation in this important area is needed to better understand the agrarian and overall economic governance. The later requires more international comparative studies as well as collection of new type of micro and macro economic data for agents, means, processes and outcome of governance, including through the official national and EU statistics.

References

AAID, (2008). *Economic Governance, Annual Thematic Performance Report 2006–07*, Australian Agency for International Development, February.

Abdulai, A. & Huffman, W. (2000). Structural adjustment and economic efficiency of rice farmers in Northern Ghana. *Economic Development and Cultural Change*, 48(3), https://doi.org/10.1086/452608

ACML, (2020). Agricultural Chain Management Law, Effective from 20.06.2020, *State Gazette Issue* 51 of June 5.

Aguilera, R., & Cuervo-Cazurra, A. (2009). Codes of good governance, corporate governance, *An International Review*, 17(3), 376-387. doi. https://doi.org/10.1111/j.1467-8683.2009.00737.x

Alam, S., Munizu, M., Munir, A.R., Pono, M., & Kadir, A.R.O. (2020). Development Model of Competitiveness of Chicken Farm SMEs in Sidrap Regency, South Sulawesi, Indonesia. ESPACIOS, 41(10), 23-42.

Ali, M. (2015). Governance and Good Governance: A Conceptual Perspective, *The Dialogue*, 67(1), 67-77.

Allen, J., DuVander, J.Y., Kubiszewski, I., & Ostrom, E. (2011). Institutions for Managing Ecosystem, *Services Solutions*, 2(6), 44-49.

Andrews, M. (2008). The good governance agenda: Beyond indicators without theory, *Oxford Development Studies*, 36(4), 379-407. https://doi.org/10.1080/13600810802455120

Andrew, D., Semanik, M., & Torsekar, M. (2018). Framework for analyzing the competitiveness of advanced technology manufacturing firms, *Office of Industries Working Paper,* No.ID057.

ANSES, (2020). Sewage sludge produced during the COVID-19 epidemic can only be applied to fields after disinfection, *The French Agency for Food, Environmental and Occupational Health & Safety*, 02/04/2020.

Asfaw, M., Geta, E., & Mitiku, F. (2019). Economic efficiency of smalholder farmers in wheat production: The case of Abuna Gindeberet District, Western Ethiopia. *Review of Agricultural and Applied Economics, Acta Oeconomica et Informatica*, 22(1), 65-75, doi. https://doi.org/10.15414/raae.2019.22.01.65-75

Atristain, S.C. (2013). *Organizational Performance and Competitiveness: Analysis of Small Firms*, Nova Science Publisher.

Baba, A., Tayfur, G., Gunduz, O., Howard, K., Friedel, M., & Chambel, A. (2011). *Climate Change and its Effects on Water Resources, Issues of National and Global Security*, Springer Science+Business Media B.V.

Babu, S, & Juvvadi, D. (2014). *Analisis of Governance in Agriculture – a Conceptual Framework and Applications*, IFPRI.

Bayyurt, N., Serin, Z., & Arıkan, F. (2015). Good governance and agricultural efficiency, *Journal of Social and Development Sciences*, 6(1), 14-23. doi. https://doi.org/10.22610/jsds.v6i1.831

Bevir, M. (2012). *Governance: A Very Short Introduction*. Oxford, UK: Oxford University Press.

Backer, L. (2011). Private actors and public governance beyond the state: The multinational corporation, the financial stability board and the global governance order, *Indiana Journal of Global Legal Studies*, 17, 751-802.

Benson, G. (2007). Competitiveness of NC Dairy Farms, North Carolina State University. Link: http://www.ag-econ.ncsu.edu/faculty/benson/DFPPNatComp01.PDF

Benz, M. & Frey, B. (2005). Corporate governance: What can we learn from public governance? *Academy of Management Review, Working Paper,* No.16.6.

Bloor, K. (2022). Global governance: political and economic governance, in *Understanding Global Politics,* K. Bloor (Ed.), E-International Relations.

Boelee, E. (Editor) (2013). *Managing Water and Agroecosystems for Food Security*, CABI.

Boevsky, I. (2020). *Cooperative Movement in Bulgaria*, University Publishing, Sofia.

Boevsky, I. & Sarov, A. (2017). Cooperative governance-challenges and perspectives: Proceeding scientific forum, *The XXI Century Business-Trends and Challenges, UNWE*, Sofia, 366-377.

Braun, J., & Birner, R. (2017). Designing global governance for agricultural development and food and nutrition security, *Review of Development Economics*, 21(2), 265-284. doi. https://doi.org/10.1111/rode.12261

Britanica, (2023). Governance. Link: https://www.britannica.com/topic/civil-union

Bachev, H. (2000). Bulgarian experience in transformation of farm structures, *Farm Management and Rural Planning*, 1, 181-196.

Bachev, H. (2002). Study on land supply in Bulgarian farms, *Farm Management and Rural Planning,* 9(3), 189-203. doi. https://doi.org/10.14505//jemt.v9.3(27).06

Bachev, H. (2004). *Governing of Finance Suppy in Bulgarian Farms*, MPRA & SSRN.

Bachev, H. (2006). Governing of Bulgarian farms–modes, efficiency, impact of EU accession, in agriculture in the face of changing markets, institutions and policies: Challenges and strategies, *IAMO*, 133-149. doi. https://doi.org/10.1007/978-1-4020-8960-2_23

Bachev, H. (2007). Governing of agrarian sustainability, *ICFAI Journal of Environmental Law,* 6(2), 7-25.

Bachev, H. (2009). *Governing of Agro-ecosystem Services. Modes, Efficiency, Perspectives*, VDM Verlag.

Bachev, H. (2010). *Governance of Agrarian Sustainability*, New York: Nova Science Publisher.

Bachev, H. (2009). Mechanisms of governance of sustainable development, *Journal of Applied Economic Sciences,* 4(8), 169-184.

Bachev, H. (2011). Management of agro-ecosystem services: Framework of analysis, case of Bulgaria, in J. Daniels (Ed.), *Advances in Environmental Research*. Vol.17, (pp.119-164), New York: Nova Science.

Bachev, H (2011). Water governance in Bulgarian agriculture, in *Climate Change and its Effects on Water Resources*, (pp.215-224), Springer.

Bachev, H. (2012). Governing of agro-ecosystem services in Bulgaria, in *Research Topics in Agricultural and Applied Economics*, A. Rezitis (Ed.), Vol.3, (pp.94-129), Bentham Science Publisher.

Bachev, H. (2012). *Competitiveness of Bulgarian farms in conditions of EU CAP implementation*, SSRN &MPRA.

Bachev, H. (2014). Environmental management in agriculture, Economic Tought, Икономическа мисъл, 1, 56-79

Bashev, H. (2016). Defining and assessment of sustainability of farms, *Economic Studies Journal*, 3, 158-188.

Bachev, H. (2017). Socio-economic and environmental sustainability of Bulgarian farms, Agricultural and resource economics, *International scientific e-journal*, 3(2), 5-21. doi. http://dx.doi.org/10.22004/ag.econ.260662

Bachev, H. (2018). *The Sustainability of Farming Enterprises in Bulgaria*, Cambridge Scholars Publishing.

Bachev, H. (2018). Institutional environment and climate change impacts on sustainability of Bulgarian agriculture, *Bulgarian Journal of Agricultural Science*, 24(4), 523-536.

Bachev, H. (2020). Defining, analyzing and improving the governance of agroecosystem services, *Economic Thought*, 4(1), 31-55.

Bachev, H. (2020). Understanding and improving the governance of ecosystem services: The case of agriculture, *Journal of Economics Bibliography*, 7(3), 170-195.

Bachev, H. (2020). Understanding, evaluating and improving the system of governance of agro-ecosystem service, *Exploratory Environmental Science Research*, 1(1), 96-114.

Bachev, H. (2020). About the governance of agro-ecosystem services, *Open Journal of Economics and Commerce*, 3(1), 24-36.

Bachev, H. (2021). A study on amount and importance of ecosystem services from Bulgarian agriculture, *Journal of Business Analytics and Data Visualization*, 2(1), 7-27.

Bachev, H. (2021). Modes of governance for ecosystem services in Bulgarian farms, *Economic Studies*, 30(8), 145-174.

Bachev, H. (2021). Agro-ecosystem services management of Bulgarian farms, *Bulgarian Journal of Agricultural Science*, 27(6), 1023-1038.

Bachev, H. (2021). Assessing and improving the governance of agroecosystem services, in *Agricultural Research Updates*, P. Gorawala and S. Mandhatri, (Eds.), Vol.33, (pp.53-92).

Bachev, H. (2021). Identifying and evaluating the mechanisms and modes of governance of ecosystem services – The case of Bulgarian agriculture, *Sumerianz Journal of Economics and Finance*, 4(4), 117-135. doi. https://doi.org/10.47752/sjef.44.117.135

Bachev, H. (2021). Study on governance mechanisms and modes of ecosystem services in Bulgarian farms. *Journal of Advanced Research in Management*, 12(2), 54-76.

Bachev, H. (2021). *Agricultural Economics, Governance and Innovation in Bulgaria Vol.1 and Vol.2*, KSP books.

Bachev, H., & Tsuji, M. (2001). *Governing of Agrarian Transactions, Management and Rural Planning II*, Kyushu University, Fukuoka.

Bachev, H., & Nanseki, T. (2008). Risk governance in Bulgarian dairy farming, paper presented at the *12th Congress of the European Association of Agricultural Economists "People, Food and Environments–Global Trends and European Strategies*", 26-29 August 2008, Ghent.

Bachev, H., & Nanseki, T. (2008). *Risk governance in Bulgarian dairy farming*, MPRA.

Bachev, H., & Nanseki, T. (2007). Environmental management in Bulgarian agriculture–risks, modes, major challenges, *Journal of the Faculty of Agriculture of Kyushu University*, 53, 363-373. doi. https://doi.org/10.5109/10114

Bachev, H., & Ito, F. (2014). Implications of Fukushima Nuclear Disaster for Japanese agri-food chains, *International Journal of Food and Agricultural Economics*, 2(1), 95-120.

Bachev, H., & Terziev, D. (2018). A study on agrarian sustainability impact of governance modes in Bulgaria, *Journal of Applied Economic Sciences*, 13(1), 227-257.

Bachev, H., & Terziev, D. (2019). Sustainability of agricultural industries in Bulgaria, *Journal of Applied Economic Sciences*, 14(1), 118-129.

Bachev, H., Ivanov, B., & Sarov, A. (2020). Unpacking governance sustainability of Bulgarian agriculture, Икономически изследвания, 6(1), 106-137.

Bachev, H., Ivanov, B., & Sarov, A. (2020). Why and how to assess the "Governance" aspect of agrarian sustainability: The case of Bulgaria, in *Agricultural Research Updates*. Vol.30, P. Gorawala & S. Mandhatri, (Edt.), (pp.49-104), Nova Science Publisher.

Bachev, H., Ivanov, B., & Sarov, A. (2021). Assessing governance aspect of agrarian sustainability in Bulgaria, *Bulgarian Journal of Agricultural Sciences*, 2, 35-60.

Bachev, H. (2023). Agrarian governance: Who, what, why, how, where, when, price, level?, *Theoretical and Practical Research in Economic Fields*, 14(27), 105-125. doi. https://doi.org/10.14505/tpref.v14.1(27).10

Bachev, H. (2023). What is agrarian governance?, in *Progress in Economics Research*, Vol. 51, A. Tavidze (Ed), Nova Science Publisher, New York.

Bachev, H., & Ivanov, B. (2021). A study on wastewater treatment sludge utilization in Bulgarian agriculture, *Technology Audit and Production Reserves*, 5(4), 35-44. doi. https://doi.org/10.15587/2706-5448.2021.240343

Bachev, H., & Ivanov, B. (2021). Identification of factors for agricultural use of sludge from wastewater treatment in Bulgaria, *The IUP Journal of Supply Chain Management*, 18(3), 48-71.

Bachev, H., & Ivanov, B. (2021). Efficiency and factors for agricultural use of sludge in circular Bulgarian economy, *Journal of Applied Economic Sciences*, 16(3), 280-301.

Bachev, H., & Ivanov, B. (2021). Agricultural sludge utilization in Bulgaria, in *Progress in Economics Research*. Vol.48, A. Tavidze (Edt.), (pp.53-86), Nova Science.

Bachev, H., & Ivanov, B. (2022). Transforming sludge from a waste into product in circular economy of Bulgarian agriculture, *Economía Coyuntural*, 7(2). doi. https://doi.org/1056274/ec.2022.v.7n2.5

Bachev, H., & Ivanov, B. (2022). Factors for inclusion of wastewater treatment sludge in agri-food chain in Bulgaria, *Journal of Economics Library*, 8(3), 107-129.

Carbone, A. (2017). Food supply chains: coordination governance and other shaping forces. *Agricultural and Food Economics*, 5, 3. doi. https://doi.org/10.1186/s40100-017-0071-3

Chakrabarti, U. (2021). *Assembling the Local: Political Economy and Agrarian Governance in British India*. The University of Pennsylvania Press.

Cheshire, L., Higgins, V., & Lawrence, G. (2007). *Rural Governance. International perspectives*, Routledge.

Chetroiu, R., & Călin, V. (2013). The concept of economic efficiency in agriculture. *MPRA Paper*, No.55007.

Chhotray, V., & Stoker, G. (2009). *Governance Theory and Practice. A Cross-Disciplinary Approach*, Palgrave Macmillan.

Chursin, A., & Makarov, Y. (eds.). (2015). *Management of Competitiveness: Theory and Practice*. London: Springer.

Ciaian, P., Pokrivcak, J., & Drabik, D. (2009). Transaction costs, product specialisation and farm structure in Central and Eastern Europe, *Post-Communist Economies*, 21(2), 191-201. doi. https://doi.org/10.1080/14631370902778526

Council of Europe, (2022). *12 Principles of Good Democratic Governance*, Council of Europe.

Csaba, J., & Irz, X. (2015). Competitiveness of dairy farms in Northern Europe: A cross-country analysis, *Agricultural and Food Science*, 24(3), 206-218. doi. https://doi.org/10.23986/afsci.50881

Csaki, C., Forgács, C., Milczarek, D., & Wilkin, J. (2008). *Regional Outcome: Central and Eastern Europe, Restructuring market relations in food and agriculture of Central and Eastern Europe - Impacts upon small farmers*. Agroinform, Budapest.

Coase, R. (1937). The nature of the firm, *Economica*, 4(16), 386-405. doi. https://doi.org/10.1111/j.1468-0335.1937.tb00002.x

Coase, R. (1998). The new institutional economics, *American Economic Review*, 88(2), 72-74.

Coase, R. (1991). The institutional structure of production, Nobel Prize Lecture, *American Economic Review*, 82(4), 713-719.

Combary, O. (2017). Analysing the efficiency of farms in Burkina Faso. *African Journal of Agricultural and Resource Economics*, 12(3), 242-256.

Cook, M. (1995). The future of U.S. agricultural cooperatives: A neo-institutional approach, *American Journal of Agricultural Economics*, 77(5), 1153-1159. doi. https://doi.org/10.2307/1243338

Darjaven, V. (2020). Law for governing agro-food chain, *State Gazette*, 51, 5 June 2020.

Dasgupta, S., & Roy, I. (2011). *Good Agricultural Governance, A Resource Guide Focused on Smallholder Crop Production*, RAP Publication 2011/18, FAO.

Davidova, S., & Thomson, K. (2014). *Family Farming in Europe: Challenges and Prospects*. European Parliament.

De Groot, Wilson, R., Boumans, M.R. (2002). A typology for the description, classification and valuation of ecosystem functions goods services. *Ecological Economics*, 41(3), 393-408. doi. https://doi.org/10.1016/S0921-8009(02)00089-7

Debebe, S., Haji, J., Goshu, D., & Edriss, A. (2015). Technical, allocative, and economic efficiency among smallholder maize farmers in Southwestern Ethiopia: Parametric approach. *Journal of Development and Agricultural Economics*, 7(8), 283-292. doi. https://doi.org/10.5897/JDAE2015.0652

Demir, I. (2016). The firm size, farm size, and transaction costs: the case of hazelnut farms in Turkey, *Agricultural Economics*, 47(1), 81-90. doi. https://doi.org/10.1111/agec.12211

DFID, (2010). The limits of decentralized governance: the case of agriculture in Malawi, *DFID*, No.033.

Dimitrov, M., Keremidchiev, S., Chipev, S., Bakardzhieva, R., Daskalov, V., & Ivanova, N. (2014). *Corporate Governance for the XXI Century*. Gorex Press, Sofia.

Dixit, A. (2016). *Economic Governance*, The New Palgrave Dictionary of Economics, Springer.

Dresch, A., Collatto, D., & Lacerda, D. (2018). Theoretical understanding between competitiveness and productivity: firm level, *Ingeniería y Competitividad*, 20(2), 201-218. doi. https://doi.org/10.25100/iyc.v20i1.5897

EC, (2008). Environmental, economic and social impacts of the use of sewage sludge on land. Link: https://ec.europa.eu/environment/archives/waste/sludge/pdf/part_i_report.pdf

EC, (2021). Public Administration and Governence, Bulgaria: EC.

EEA, (2015). Ecosystem services in the EU, European Environment Agency.

EU, (2019). European Governance, EU. Link: https://eur-lex.europa.eu/summary/glossary/governance.html

EU, (2021). Roundtable discussion on sludge use. Link: https://ec.europa.eu/environment/archives/waste/sludge/pdf/workshoppart5.pdf

Ekane, N., Barquet, K., & Rosemarin, A. (2021). Resources and risks: Perceptions on the application of sewage sludge on agricultural land in Sweden, a case study, *Front. Sustain. Food Syst*.,

Falciola, J., Jansen, M., & Rollo, V. (2020). Defining firm competitiveness: A multidimensional framework, *World Development,* 129, 104857. doi. https://doi.org/10.1016/j.worlddev.2019.104857

FAO, (2010). *International Competitiveness of 'Typical' Dairy Farms*, FAO.

FAO, (2016). *Mainstreaming Ecosystem Services and Biodiversity Into Agricultural Production and Management in East Africa*, Technical guidance document, FAO.

FAO, (2021). *Small Family Farmers Produce a Third of the World's Food*. Food and Agriculture Organisation of UN.

Foster, A., & Rosenzweig, M. (2022). Are there too many farms in the World? Labor market transaction costs, machine capacities, and optimal farm size. *Journal of Political Economy*, 130(3), 636-680. doi. https://doi.org/10.1086/717890

Fremier, A., DeClerck, F., Bosque-Pérez, N., Carmona, N., Hill, R., Joyal, T., Keesecker, L., Klos, P., Martínez-Salinas, A., Niemeyer, R., Sanfiorenzo, A., Welsh, K., & Wulfhorst, J. (2013). Understanding spatiotemporal lags in ecosystem services to improve incentives, *BioScience,* 63(6), 472-482. doi. https://doi.org/10.1525/bio.2013.63.6.9

Frija, A., Sghaier, M., Fetoui, M., Dhehibi, B., & Sghaier, M. (2021). *The Governance of Collective Actions in Agro-Silvopastoral Systems in Tunisia. A Historical Institutional Analysis, in Governance for Mediterranean Silvopastoral Systems*, Routledge.

Freidberg, S. (2019). "Unable to determine": Limits to metrical governance in agricultural supply chains, *Science, Technology, & Human Values*, 45(4), 738-760. doi. https://doi.org/10.1177/0162243919870234

Fukuyama, F. (2016). Governance: What do we know, and how do we know it? *Annual Review Political Sciences*. 19, 89-105. doi. https://doi.org/10.1146/annurev-polisci-042214-044240

Furuboth, E., & Richter, R. (2005). *Institutions and Economic Theory: The Contribution of the New Institutional Economics*. Ann Arbor: The University of Michigan Press.

Ganev, G., Popoca, M., & Bonken, F. (2020). *Bulgaria Report, Sustainable Governance Indicators*, SGI.

Gao, H., Fu, T., Liu, J., Liang H., & Han, L. (2018). Ecosystem services management based on differentiation and regionalization along vertical gradient, China, *Sustainability*, 10(4), 986. doi. https://doi.org/10.3390/su10040986

Garbach, K., Milder, J., Montenegroand, M., & DeClerck, F. (2014). *Biodiversity and Ecosystem Services in Agroecosystems*, Elsevier.

Gaviglio, A., Filippini, R., Madau, F., Marescotti, M., & Demartini, E. (2021). Technical efficiency and productivity of farms: a periurban case study analysis. *Agricultural and Food Economics*, 9(11), 1-18. doi. https://doi.org/10.1186/s40100-021-00181-9

Gemmill-Herren, B. (2018). *Pollination Services to Agriculture Sustaining and Enhancing a Key Ecosystem Service*, Routledge.

Georgiev, M. (2013). Impact of the administration structure and transaction costs on the agricultural land market, *Trakia Journal of Sciences*, 11(11), 527-534.

Georgiev, M. & Roycheva, A. (2017). New institutional economics and methods for measuring the adaptation of Bulgarian agriculture. *Trakia Journal of Sciences*, 15(1), 199-205. doi. https://doi.org/10.15547/tjs.2017.s.01.037

German, L. (2018). Catalyzing self-governance: Addressing multi-faceted collective action dilemmas in densely settled agrarian landscapes. *International Journal of the Commons*, 12(2), 217-250. doi. https://doi.org/10.18352/ijc.852

Giaime, B., & Mulligan, C. (2016). Competitiveness of small farms and innovative food supply chains: The role of food hubs in creating sustainable regional and local food systems, *Sustainability*, 8(7), 616. doi. https://doi.org/10.3390/su8070616

Grigorova, Y., & Kazakova Y. (2008). High nature value farmlands: Recognizing the importance of South East European landscapes, Case study report, *Western Stara Planina*, WWF(EFNCP).

Gunes, E., & Guldal, H. (2019). Determination of economic efficiency of agricultural enterprises in Turkey: a DEA approach. *New Medit*, 4, 105-115, doi. https://doi.org/10.30682/nm1904h

Guth, M., & Smędzik-Ambroży, K. (2020). Economic resources versus the efficiency of different types of agricultural production in regions of the European union,

Economic Research-Ekonomska Istraživanja, 33(1), 1036-1051. doi. https://doi.org/10.1080/1331677X.2019.1585270

Habib, T., Heckbert, S., Wilson, J., Vandenbroeck, AJ., & Farr, D. (2016). Impacts of land-use management on ecosystem services and biodiversity: an agent-based modelling approach. *PeerJ*, 4, e2814. doi. https://doi.org/10.7717/peerj.2814

Habtamu, A., Lien, G., & Hardaker, J. (2018). Economic performance and efficiency determinants of crop-producing farms in Norway. *International Journal of Productivity and Performance Management*, 67(9), 1418-1434. doi. https://doi.org/10.1108/IJPPM-01-2018-0026

Hakim, R., Haryanto, T., & Sari, D. (2021). Technical efficiency among agricultural households and determinants of food security in East Java, Indonesia. *Scientific Reports*, 11, 4141. doi. https://doi.org/10.1038/s41598-021-83670-7

Herrfahrdth, E. (2006). *Water Governance in the Kyrgyz Agricultural Sector*, DFID, Bonn.

Higgins, V., & Lawrence, G. (2005). *Agricultural Governance: Globalization and the New Politics of Regulation*, Routledge.

Hoppe, B. (2021). *Diverse Family Farms Are Important to U.S. Agriculture. Economic Research Service in Farming Research and Science*. USDA.

Hudcová, H., Vymazal, J., & Rozkošný, M. (2019). Present restrictions of sewage sludge application in agriculture within the European Union, *Soil and Water Research*, 14(2), 104-120. doi. https://doi.org/10.17221/36/2018-SWR

Huy, H., Lyne, M., Ratna, N., & Nuthall, P. (2016). Drivers of transaction costs affecting participation in the rental market for cropland in Vietnam. *Australian Journal of Agricultural and Resource Economics*, 60(3), 476-492. doi. https://doi.org/10.1111/1467-8489.12149

Hufty, M. (2011). Investigating policy processes: The governance analytical framework. In *Research for Sustainable Development*, (pp.403-424), Bern: Geographica Bernensia.

IFAD, (1999). *Good Governance: an Overview*, IFAD, Executive Board – Sixty-Seventh Session, Rome, 8-9 September 1999.

INRA, (2017). *A Framework for Assessing Ecosystem Services from Human-Impacted Ecosystems*. EFESE.

IoG, (2003). *Principles for Good Governance in the 21st Century*, Institute of Governance.

Iticescu C., Georgescu, P., Arseni, M., Rosu, A., Timofti, M., Carp, G., & Cioca, L. (2021). Optimal solutions for the use of sewage sludge on agricultural lands. *Water*, 13(5), 585. doi. https://doi.org/10.3390/w13050585

Ivanov, B. (2022). Working paper for application of methodology for assessment for comparative analysis and probability estimation. *Institute of Agricultural Economics*, Sofia.

Ivanov, B., & Bachev, H. (2021). Convergent analysis of waste water practices among EU countries, *Bulgarian Journal of Agricultural Science*, 27(2), 289-296.

Ivanov, B., & Bachev, H. (2023). How Good is the Governance of Bulgarian Agriculture?, Economic Alternatives *(under publication).*

James, H., Klein, P., & Sykuta, M. (2011): The adoption, diffusion, and evolution of organizational form: Insights from the agrifood sector, *Managerial and Decision Economics,* 32(4), 243-259. doi. https://doi.org/10.1002/mde.1531

Kanianska, R. (2019). *Agriculture and Its Impact on Land-Use, Environment, and Ecosystem Services*, INTECH.

Katsamunska, P. (2016). The concept of governance and public, governance theories, *Economic Alternatives*, 2, 134-141.

Kleinhanss, W. (2020). Competitiveness of the Main Farming Types in Germany, *20th International Farm Management Congress Vol.1*, IFMA.

Kopeva, D., & Ivanova, N. (2008). Efficiency and sustainable development of Bulgarian farms (On the basis of cereal, fruit and vegetables production). *Management and Sustainable Development*, 4 (2), 128-133. doi. https://doi.org/10.57017/jaes.v17.1(75).01

Koteva, N. (2014). Agricultural farms economic effectiveness in Bulgaria. *Agricultural Economics and Management*, 59(2), 20-32.

Krisciukaitiene, I., Melnikiene, R., & Galnaityte, A. (2020). *Competitiveness of Lithuanian Farms and Their Agriculture Production from Present to Medium - Term Perspectives*, Lithuanian IAE.

Kumar, A., & Sharma, A. (2020). Socio-Sentic framework for sustainable agricultural governance, *Sustainable Computing: Informatics and Systems*, 28, 100274. doi. https://doi.org/10.1016/j.suscom.2018.08.006

Kusz, D. (2018). Farms competitiveness in selected countries of Central and Eastern Europe, *Management, Economic Engineering in Agriculture and Rural Development*, 18(3), 211-218.

Latruffe, L. (2010). Competitiveness, productivity and efficiency in the agricultural and agri-food sectors. *OECD Food, Agriculture and Fisheries Papers*, No.30, OECD Publishing.

Latruffe, L. (2013). Competitiveness in the agricultural sector: measures and determinants. *Farm Policy Journal*, 11(3), 9-17. doi. https://doi.org/10.3390/agriculture12010028

Laurans, Y., & Mermet, L. (2014): Ecosystem services economic valuation, decision-support system or advocacy? *Ecosystem Services*, 7, 98-105. doi. https://doi.org/10.1016/j.ecoser.2013.10.002

Ledger, T. (2016). *Power and Governance in Agri-food Systems: Key Issues for Policymakers*, TIPS.

Lescourret, F., Magda, D., Richard, G., Adam-Blondon, A., Bardy, M., Baudry, J., Doussan, I., Dumont, B., Lefèvre, F., Litrico, I., Martin-Clouaire, R., Montuelle, B., Pellerin, S., Plantegenest, M., Tancoigne, E., Thomas, A., Guyomard, H., & Soussana, J. (2015). A social–ecological approach to managing multiple agro-ecosystem services, *Current Opinion in Environmental Sustainability*, 14, 68-75. doi. https://doi.org/10.1016/j.cosust.2015.04.001

Levi-Four, D. (ed.) (2012). *The Oxford Handbook of Governence*, Oxford University Press.

Liberati, C., Cardillo, C., & Di Fonzo, A. (2021). Sustainability and competitiveness in farms: An evidence of Lazio region agriculture through FADN data analysis. *Economia Agro-alimentare/Food Economy*, 23(3). 1-22. doi. https://doi.org/10.3280/ecag2021oa12767

Lundy, M., Gottret, M.V., Cifuentes, W., Ostertag, C.F., Best, R., Peters, D., & Ferris, S. (2010). *Increasing the Competitiveness of Market chains for Smallholder Producers*, CIAT.

Mack, G., Kohler, A., & El-Benni, N. (2019). Determinants of the perceived administrative transaction costs caused by the uptake of an agri-environmental program. *Journal and Environmental Planning and Management*, 62(10), 1802-1819. doi. https://doi.org/10.1080/09640568.2018.1515311

Maes, J., Teller, A., Erhard, M., Conde, S., Vallecillo Rodriguez, S., Barredo Cano, J.I., Paracchini, M., Malak, D.A., Trombetti, M., Vigiak, O., Zulian, G., Addamo, A., Grizzetti, B., Somma, F., Hagyo, A., Vogt, P., Polce, C., Jones, A., Carré, A., & Hauser, R. (2021). *EU Ecosystem Assessment*, Publications Office of the European Union, Luxembourg.

MAFF, (2021). *Agricultural Census, 2020*. Ministry of Agriculture, Food and Forestry (in Bulgarian).

Malapi-Nelson, A. (2017). *Cybernetics: The Book, the Club, and the Decline". The Nature of the Machine and the Collapse of Cybernetics: A Transhumanist Lesson for Emerging Technologies*. Palgrave Studies in the Future of Humanity and its Successors. Cham (Zug), Springer.

Marta-Pedroso, C., Laporta, L., Gama, I., & Domingos, T. (2018). Economic valuation and mapping of Ecosystem Services in the context of protected area management, *One Ecosystem*, 3, e26722. doi. https://doi.org/10.3897/oneeco.3.e26722

Massey, R., Sykuta, M., & Pierce, V. (2020). *Contracts in Agriculture*. Farm management. University of Missouri. Link: https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pub/pdf/agguides/agecon/g00312.pdf

Masterson, J. (2007). Productivity, technical efficiency, and farm size in Paraguayan agriculture. The Levy Economics Institute Working Paper Collection, *Working Paper,* No.490,

Masuku, B., & Belete, A. (2014). Economic efficiency of smallholder dairy farmers in Swaziland: An application of the profit function. *Journal of Agricultural Studies*, 2(2), 132-144. doi. https://doi.org/10.5296/jas.v2i2.6046

Marques, P.R. *et al.* (2015). Competitiveness levels in cattle herd farms. *Cienc. Rural.* 45(3), 480-484.

Marques, P., Barcellos, J., McManus, C., Oaigen, R., Collares, F., Canozzi, M., & Lampert, V. (2011). Competitiveness of beef farming in Rio Grande do Sul State, Brazil, *Agricultural Systems*, 104(9), 689-693. doi. https://doi.org/10.1016/j.agsy.2011.08.002

Maurice, D., Adamu, Y., & Joseph, M. (2015). Analysis of cost efficiency in food production among small-scale farmers in Adamawa State, Nigeria, *Global Journal of Agricultural Sciences*, 14, 17-25. doi. http://dx.doi.org/10.4314/gjas.v14i1.3

MEA, (2005). *Millennium Ecosystem Assessment, Ecosystems and Human Well-being*, Island Press, Washington, DC.

Mmari, D. (2015). *Institutional Innovations and Competitiveness Of Smallholders In Tanzania*, Thesis to obtain the degree of Doctor from the Erasmus University Rotterdam.

Morfi, C. (2020). *Organisation and Governance of Agri-Food Systems Implications of Intellectual Property Rights in Plant Biotechnology*, Doctoral Thesis, Faculty of Natural Resources and Agricultural Sciences, Uppsala.

Mugwagwa, I., Bijman, J., & Trienekens, J. (2020). Typology of contract farming arrangements: a transaction cost perspective, *Agrekon*, 59(2), 169-187. doi. https://doi.org/10.1080/03031853.2020.1731561

Muluneh, T. (2021). Conceptualizing digital agricultural governance, *International Journal of Engineering Research & Technology*, 10(1), 403-410.

Munang R., Thiaw, I., Alverson, K., Liu, J., & Han, Z. (2013). The role of ecosystem services in climate change adaptation and disaster risk reduction, *Current Opinion in Environmental Sustainability*, 5, 47-52.

Mykhailova, L., Stoyanets, N., Mykhailov, A., Kharchenko, T., & Bachev, H. (2018). Sustainable development of the Ukrainian agrarian sector: perspectives and challenges, *Problems and Perspectives in Management*, 16(3), 28-39. doi. http://dx.doi.org/10.21511/ppm.16(3).2018.03

Narzary, M. (2015). Concept of good governance. In S. Mangla (Ed), *Citizenship and Governance*, S. Mangla (Ed.), (pp.14-45), New Delhi: Kaveri Books.

Ngenoh, E., Kurgat, B.K., Bett, H., Kebede, S.W., & Bokelmann, W. (2019). Determinants of the competitiveness of smallholder African indigenous vegetable farmers in high-value gro-food chains in Kenya: A multivariate probit regression analysis, *Agricultural and Food Economics*, 7, 2-17. doi. https://doi.org/10.1186/s40100-019-0122-z

Nivievskyi, O., & von Cramon-Taubadel, S. (2010). The determinants of dairy farming competitiveness in Ukraine, Institute for Economic Research and Policy Consulting *Policy Paper Series*, No.AgPP/23.

North, D. (1990). *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press.

North, D. (1991). Institutions, *Journal of Economic Perspectives*, 5(1), 97-112.

Novikova, A., Rocchi, L., & Vitunskienė, V. (2017). Assessing the benefit of the agroecosystem services: Lithuanian preferences using a latent class approach, *Land Use Policy*, 68, 277-286. doi. https://doi.org/10.1016/j.landusepol.2017.07.051

Nowak, A. (2016). Regional differences in the competitiveness of farms in Poland, *Journal of Agribusiness and Rural Development*, 3(41), 345-354. doi. http://dx.doi.org/10.22004/ag.econ.253925

Nowak, A., & Krukowski, A. (2019). Competitiveness of farms in new European Union member states, *Agronomy Science*, 2, 73-80. doi. https://doi.org/10.24326/as.2019.2.7

Nowak, A., & Różańska-Boczula, M. (2022). The competitiveness of agriculture in EU member states according to competitiveness pyramid model, *Agriculture*, 12(1), 28. doi. https://doi.org/10.3390/agriculture12010028

Nunes, P., Kumar, P., & Dedeurwaerdere, T. (2014). *Handbook on the Economics of Ecosystem Services and Biodiversity*, Edward Elgar, Cheltenham.

OECD, (2011). *Fostering Productivity and Competitivenessin Agriculture*, OECD.

OECD, (2015), *G20/OECD Principles of Corporate Governance*, OECD Publishing, Paris.

OECD, (2019). *Review of the Corporate Governance of State-Owned Enterprises*. Bulgaria, OECD.

Okoruwa, V., Akindeinde, A., & Salimonu, K. (2009). Relative economic efficiency of fars in rive production: A profit function approach in North Central Nigeria, *Tropical and Subtropical Agroecosystems*, 10(2), 279-286.

Oktariani, A., Daryanto, A., & Fahmi, I. (2016). The competitioness of dairy farmes based fresh milk marketing on agro-tourşsm, *International Journal of Animal Health and Livestock Production Research*, 2(1), 18-38.

Orłowska, M. (2019). Competitiveness of Pollish organic farms with different economic size in light of dadn data, *Annals PAAAE*, 21(2), 217-224. doi. https://doi.org/10.5604/01.3001.0013.2074

Osabohien, R., Ufua, D., Moses, C.L., & Osabuohien, E. (2020). Accountability in agricultural governance and food security in Nigeria. *Brazilian Journal of Food Technology*, 23. doi. https://doi.org/10.1590/1981-6723.08919

Osmani M., Kolaj, R., Borisov, P., & Arabska, E. (2021). Competitiveness between figures and metaphors; are farmers' apple producers enough competitive? *Bulgarian Journal of Agricultural Science*, 27(1), 31-43.

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge University Press.

Ostrom, E. (1999). Revisiting the commons: Local lessons, global challenges, *Science,* 284, 278-282.

Ostrom, E. (2009). Beyond markets and states: Polycentric governance of complex economic systems, *Nobel Prize Lecture*, December 8.

Ostrom, E. (2014). A polycentric approach for coping with climate change, *Annals of Economics and Finance*, 15(1), 97-134.

Ostrom, E., & Schlüter, A.A. (Eds.) (2007). *The challenge of self-governance in complex, globalizing economies: Collection of revised papers of a PhD seminar*, Arbeitsbericht, Working Paper No. 47-2007.

Petteri, V., D'Amato, D., Forsius, M., Angelstam, P., Baessler, C., Balvanera, P., Boldgiv, B., Bourgeron, P., Dick, J., Kanka, R., Klotz, S., Maass, M., Melecis, V., Petrık, V., Shibata, H., Tang, J., Thompson, J., & Zacharias, S. (2013). Using long-term ecosystem service and biodiversity data to study the impacts and adaptation options in response to climate change: insights from the global ILTER sites network, *Current Opinion in Environmental Sustainability,* 5, 53-66.

Planas, J., Schuurman, A., & Segers, Y. (2022). *The Formation of Agricultural Governance: the Interplay between State and Civil Society in European Agriculture, 1870-1940*, WASS Rural and Environmental History.

Power, A. (2010). Ecosystem services and agriculture: Tradeoffs and synergies. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 365, 2959-2971. doi. https://doi.org/10.1098%2Frstb.2010.0143

Radeva, D. (2017). *Economics of the New Alternative Agriculture, - Permaculture*. PhD dissertation, UNWE (in Bulgarian).

Riegner, M. (2012). Measuring the good governance state: A legal reconstruction of the World Bank's "Country policy and institutional assessment", *IRPA Working Paper,* GAL, No.6/2012.

Rodorff, V., Siegmund-Schultze, M., Guschal, M., Hölzl, S., & Köppel, J. (2019). Good governance: A framework for implementing sustainable land management, applied to an agricultural case in Northeast-Brazil, *Sustainability,* 11(16), 4303. doi. https://doi.org/10.3390/su11164303

Ronaghi, M., Ronaghi, M., & Kohansal, M. (2020). *Agricultural Governance*, Verlag: GlobeEdit.

Rosemarin, A., Macura, B., Carolus, J., Barquet, K., Ek, F., Järnberg, L., Lorick, D., Johannesdottir, S., Pedersen, S., Koskiaho, J., Haddaway, N., & Okruszko, T. (2020). Circular nutrient solutions for agriculture and wastewater – a review of technologies and practices, *Current Opinion in Environmental Sustainability*, 45,78-91. doi. https://doi.org/10.1016/j.cosust.2020.09.007

Rosiek, K. (2020). Directions and challenges in the management of municipal sewage sludge in Poland in the context of the circular economy, *Sustainability*, 12, 3686. doi. https://doi.org/10.3390/su12093686

Sacconi, L. (2012). Corporate social responsibility and corporate governance, *EconomEtica*, 38, SSRN, Working papers, N.38.

Sauvenier, X., Valekx, J., Van Cauwenbergh, N., Wauters, E., Bachev, H., Biala, K., Bielders, C., Brouckaert, V., Garcia-Cidad, V., Goyens, S., Hermy, M., Mathijs, E.,

Muys, B., Vanclooster, M., & Peeters, A. (2005). Framework for Assessing Sustainability Levels in Belgium Agricultural Systems, *SAFE. Final Report*. Brussels: Belgium Science Policy.

Scholes, R., Reyers, B., Biggs, R., Spierenburg, M., & Duriappah, A. (2013). Multi-scale and cross-scale assessments of social–ecological systems and their ecosystem services, *Current Opinion in Environmental Sustainability*, 5(1), 16-25. doi. https://doi.org/10.1016/j.cosust.2013.01.004

Schwindenhammer, S. (2018). The new regionalism in global organic agricultural governance through standards: A cross-regional comparison, *Global Environmental Politics*, 18(3), 86-105. doi. https://doi.org/10.1162/glep_a_00469

Scozzari, A., El-Mansouri, B. (2011). *Water Security in the Mediterranean Region, An International Evaluation of Management, Control, and Governance Approaches*, Springer Science+Business Media B.V.

Skarżyńska, A. (2019). Economic size and production efficiency of farms specializing in field crops in Poland. *Problems of Agricultural Economics*, 1(358), 64-87. doi. https://doi.org/10.30858/zer/104385

Skerman, T. (2016). *Agribusiness Governance Finding the Green Zone*, Rural Leaders.

Shand, R. (2018). *The Governance of Sustainable Rural Renewal. A Comparative Global Perspective*, Routledge.

Scmitter, P. (2018). *Defining, Explaining and, Then, Exploiting the Elusive Concept of 'Governance'*, Springer Heidelberg.

Stefanov, R., Yalamov, T., & Mineva, D. (2016). *Hidden Economy and Good Governance in Southeast Europe*, Regional Assessment Report, Seldi.

Steffek, J., & Wegmann, P. (2021). The standardization of "good governance" in the age of reflexive modernity, *Global Studies Quarterly*, 4(1), ksab029. doi. https://doi.org/10.1016/j.eist.2019.08.002

Sykuta, M. (2010). Concentration, contracting and competition: Problems in using the packers & stockyards act to supplement antitrust, *The CPI Antitrust Journal*, 4(2), 1-8.

Sykuta, M., & Cook, M. (2001). A new institutional economics approach to contracts and cooperatives, *American Journal of Agricultural Economics*, 83(5), 1273-1279.

Tanic, S., & Lonc, T. (2004). Farm Commercialisation and Income Diversification of the Road to EU Accession (Коммерциализация ферм и диверсификация доходов на пути к вступлению в ЕС), FAO.

Taşeli, B. (2020). *Comparative Life Cycle Assessment of Sewage Sludge (Biosolid) Management Options*, Intech.

Terziev, D., & Bachev, H. (2021). Studying the Resilience of Farming Systems. Economic Theory Point of View. 178th EAAE Seminar. Link: https://178eaaeseminar.org/wp-content/uploads/2021/05/20.05.2021-Terziev-D.pdf

Terziev, D., Zhou, P., Terziyska, T., & Zhang, D. (2018). *Food Safety: Technologies and Governance*, Sofia: Yearbook of UNWE.

Terziyska, R. (2016). *Governance of Network Structures in Agrarian Business*, PhD dissertation, UNWE (in Bulgarian)

Tesema, T. (2021). Determinants of allocative and economic efficiency in crop-livestock integration in western part of Ethiopia evidence from Horro district: data envelopment approach. *Heliyon*, 7, e07390, https://doi.org/10.1016/j.heliyon.2021.e07390

Tesfamariam, E., Ogbazghi, Z., Annandale, J., & Gebrehiwot, Y. (2020). Cost–benefit analysis of municipal sludge as a low-grade nutrient source: A case study from South Africa, *Sustainability*, 12, 9950. doi. https://doi.org/10.3390/su12239950

The European Green Deal, (2019). Communication from the commission to the European Parliament, the European Concil, the Concil, The European Economic and Social Committee and the Committee and the Regions, *European Commission*, 11.12.2019.

Tleubayev, A., Bobojonovb, I., Gagalyukc, T., Mecad, E., & Glaubene, T. (2021). Corporate governance and firm performance within the Russian agri-food sector: does ownership structure matter? *International Food and Agribusiness Management Review*, 24(4), 649-668. doi. https://doi.org/10.22434/IFAMR2019.0184

Todorova, K. (2017). Adoption of ecosystem-based measures in farmlands – new opportunities for flood risk management, *Trakia Journal of Sciences*, 15(1), 152-157.

Torres-Salcido, G., & Sanz-Cañada, J. (2018). Territorial governance. A comparative research of local agro-food systems in Mexico, *Agriculture*, 8(2), 18. doi. https://doi.org/10.3390/agriculture8020018

Tripathi, R. (2017). Good governance: Origin, importance and development in India, *International Journal of Development Research*, 7(11), 16968.

Trubek, D., & Trubek, T. (2007). New governance & legal regulation: Complementarity, rivalry, and transformation, *SSRN Legal Studies Research Paper Series*, No.1047.

Tsiafouli, M., Drakou, E., Orgiazzi, A., Hedlund, K., & Ritz, K. (2017). Optimizing the delivery of multiple ecosystem goods and services in agricultural sys-

tems, *Frontiers in Ecology and Evolution*, 5, art-9715. doi. https://doi.org/10.3389/fevo.2017.00097

Tyndale, W., & Frith, J. (1831). *The works of Tyndale*. Ebenezer Palmer.

Usman, K., Khan, S., Ghulam, S., Umar, M., Khan, N., & Khalil, S. (2012). Sewage sludge: An important biological resource for sustainable agriculture and its environmental implications, *American Journal of Plant Sciences*, 3, 1708-1721. doi. http://dx.doi.org/10.4236/ajps.2012.312209

Valentinov, V., & Curtiss, J. (2005). Toward a transaction cost theory of organizational change in transitional agriculture, *Eastern European Economics*, 43(5), 25-45.

van Oudenhoven, A. (2020). Quantifying the effects of management on ecosystem services. Link: https://www.wur.nl/en/show/Quantifying-the-effects-of-management-on-ecosystem-services.htm

Vinichenko, I., Trusova, N., Kalchenko, S., Pavlenko, O., Vasilev, S., & Holovko, R. (2021). Ensuring protection of the competitiveness of farms in the modified macro and micro environment of the multifactor risk, *Special Issue: Innovative Development and Economic Growth in the CIS Countries*, 39(6), 3-18. doi. https://doi.org/10.25115/eea.v39i6.5113

Vymětal, P. (2007). *Governance: Defining the Concept, Faculty of International Relations*, University of Economics, Prague, Working Papers, No.1/2007.

Wang, S., Fu, B., Wei, Y., & Lyle, C. (2013). Ecosystem services management: an integrated approach, *Current Opinion in Environmental Sustainability*, 5(1), 11-15. doi. https://doi.org/10.1016/j.cosust.2013.01.003

Weiss, T. (2000). Governance, good governance and global governance: conceptual and actual challenges, *Third World Quarterly*, 21(5), 795-814. doi. https://doi.org/10.1080/713701075

Williamson, O. (1996). *The Mechanisms of Governance*. New York: Oxford University Press.

Wikipedia, (2023): Governance. Link: https://en.wikipedia.org/wiki/Governance

Williamson, O. (1996). *The Mechanisms of Governance*, Oxford University Press.

Williamson, O. (1999). Public and private bureaucracies: A transaction cost economics perspective. *Journal of Law Economics and Organization*, 15(1), 306-342. doi. https://doi.org/10.1093/jleo/15.1.306

Williamson, O. (2000). The new institutional economics: Taking stock, looking ahead. *Journal of Economic Literature*. 38(3), 595-613. doi. https://doi.org/10.1257/jel.38.3.595

Williamson, O. (2005). The economics of governance. *American Economic Review*, 95(2), 1-18. doi. https://doi.org/10.1257/000282805774669880

Wisenthige, K., & Guoping, C. (2016). Firm level competitiveness of small and medium enterprises (SMEs): analytical framework based on pillars of competitiveness model. *International Research Journal of Management, IT and Social Sciences*, 3(9), 61-67. doi. https://doi.org/10.21744/irjmis.v3i9.172

Westeren, K.I., Cader, H., Sales, M.F., Similä, J.O., & Staduto, J. (2020). *Competitiveness and Knowledge, An International Comparison of Traditional Firms*, Routledge.

Westerink, J., Jongeneel, R., Polman, N., Prager, K., Franks, J., Dupraz, P., & Mettepenningen, E. (2017). Collaborative governance arrangements to deliver spatially coordinated agri-environmental management. *Land Use Policy*, 69, 176-192. doi. https://doi.org/10.1016/j.landusepol.2017.09.002

Wolman, H., Levy, A., & Hincapie, D. (2008). Government and Governence, In Wolman et al., *Economic Competitiveness and the Determinants of Sub-National Area Economic Activity,* Wolman et al. (Eds), Economic Impacts of GO TO 2040.

Wood, S., Karp, D., DeClerck, F., Kremen, C., Naeem, S., & Palm, C. (2015). Functional traits in agriculture: agrobiodiversity and ecosystem services, *Trends in Ecology & Evolution*, 30(9), 531-539. doi. https://doi.org/10.1016/j.tree.2015.06.013 .

World Bank, (1992). *Governance and Development*, World Bank.

World Bank, (2022). Worldwide Governance Indicators.

UN, (2005). *The Millennium Development Goals Report*. United Nations, New York.

UN, (2015). *The Sustainable Development Goals (SDGs),* United Nation.

Zaimova, D. (2011). Methods for assessing economic efficiency of agricultural farms, *Economic Thought*, 2, 81-94.

Zia, B., Rafiq, M., Saqib, A., & Atiq, M. (2022). Agricultural market competitiveness in the context of climate change: A systematic review, *Sustainability*,14, 3721. doi. https://doi.org/10.3390/su14073721

Ziętara, W., & Adamski, M. (2018). Competitiveness of the Polish dairy farms at the background of farms from selected European Union countries, *Problems of Agricultural Economics*, 1(354), 56-78. doi. https://doi.org/10.22004/ag.econ.276374

Zhan, J. (Edt.), (2015). *Impacts of Land-use Change on Ecosystem Services*, Springer.

(Bulgarian)

Башев Х. (2020): ДЕФИНИРАНЕ, АНАЛИЗИРАНЕ И УСЪВЪРШЕНСТВАНЕ НА УПРАВЛЕНИЕТО НА УСЛУГИТЕ НА АГРО-ЕКОСИТЕМИТЕ, Икономическа мисъл, бр. 4, 3-30.

Башев Х. И Б.Иванов (2021): Превръщането на утайките от пречистването на отпадъчни води в продукт и оползотворяването им в селското стопанство, Земеделие плюс, бр. 299 (част 1) и бр. 300 (част 2).

Башев Х. и Б.Иванов (2022): Фактори за оползотворяване на утайки от пречистването на отпадъчни води в селското стопанство на България, Икономика и управление на селското стопанство, No 2, 43-62.

Башев Х. (2023): Подход за дефиниране и анализиране на аграрното управление (governance), Икономически и социални алтернативи, 3 (в процес на публикация).

Башев Х., Б. Иванов, Д. Митова, И. Боевски, П. Маринов, А. Саров, Д. Цвяткова, К. Костенаров, Д. Ванев (2021): МЕХАНИЗМИ И ФОРМИ НА УПРАВЛЕНИЕ НА АГРОЕКОСИСТЕМНИТЕ УСЛУГИ В БЪЛГАРИЯ, ИАИ, София.

ИАИ (2021): Възможности от оползотворяването на утайки, получени при пречистване на отпадъчни води и ефект за устойчиво земеделие, отчет на научно-приложен проект, ИАИ.

Иванов Б., С. Маринова, Х. Башев, В. Георгиева (2020): Икономически и екологични ефекти от използване на утайките в земеделието, Екологично инженерство и опазване на околната среда, 3, 44-53.

Маринова С. (2008): Утайки от пречиствателни станции за отпадъчни води и правила за тяхното оползотворяване, София.

Сяров А. (2020): Социално-икономически, екологични и управленчески аспекти при оползотворяването на утайки в земеделието, получени при пречистване на отпадъчни води, Икономика и управление на селското стопанство, 1, 58-69.

Директива 86/278/ЕИО (1986): Директива 86/278/ ЕИО на Съвета от 12 юни 1986 година за опазване на околната среда, и по-специално на почвата, при използване на утайки от отпадъчни води в земеделието, ЕС.

Наредба (2017): Наредба за реда и начина за оползотворяване на утайки от пречистването на отпадъчни води чрез употребата им в земеделието (приета с ПМС № 201 от 04.08.2016г., Обн. ДВ. бр.63 от 12 Август 2016 г., изм. ДВ. бр.55 от 7 Юли 2017 г.).

НСПУУ (2014): Национален стратегически план за управление на утайки от пречиствателните станции за отпадъчни води в България за периода 2014- 2020г., Министерство на околната среда и водите, София.

ИАОС (2004-2021): ДОКЛАДИ ОТ ИЗПЪЛНИТЕЛНА АГЕНЦИЯ ПО ОКОЛНА СРЕДА СЪГЛАСНО ЧЛ. 16, АЛ. 1 ОТ НАРЕДБА ЗА РЕДА И НАЧИНА ЗА ОПОЛЗОТВОРЯВАНЕ НА УТАЙКИ ОТ ПРЕЧИСТВАНЕТО НА ОТПАДЪЧНИ ВОДИ ЧРЕЗ УПОТРЕБАТА ИМ В ЗЕМЕДЕЛИЕТО, ИАОС, София.

Башев Х (2014): Екоуправление в селското стопанство, Икономическа мисъл, 1, 29-55

Башев Х (2006): Оценка на устойчивостта на българските ферми, Икономика и управление на селското стопанство, 3, 18-28.

Башев Х (2006): Управление на аграрната и селска устойчивост, Икономика и управление на селското стопанство, 4, 27-37.

Башев Х (2022): Подход за разбиране и оценяване на управленческата ефективност на земеделските стопанства, Народностопански архив, 2, 22-41.

Котева Н, Х Башев, А Алексиев, Д Николов, П Йовчевска (2021): Конкурентоспособност на земеделските стопанства в България и модели за нейното повишаване, ИАИ, София.

Хаджиева В, Д Митова, М Анастасова, Х Башев, В Мицов (2005): Планиране на устойчивото развитие на земеделското стопанство, Икономика и управление на селското стопанство, 5, 37-43.

Башев Х. (2009): Управление на услугите на агро-екосистемите, Икономика и управление на селското стопанство No 6, 3-20.

Башев Х. (2012): Ефективност на фермите и аграрните организации, Икономическа мисъл, бр. 4, 46-77.

Башев Х. (2014): Екоуправление в селското стопанство, Икономическа мисъл, бр.1, 29-55.

Башев Х. (2015): Подход за оценка на устойчивостта на земеделските стопанства, сп.Икономика и управление на селското стопанство, 3, 12-36.

Башев Х. (2018): Въздействие На Пазарните, Частните, Колективните И Хибридните Форми На Управление Върху Аграрната Устойчивост В България, Икономика 21 8 (2), 131-176.

Башев Х., Б. Иванов, Д. Тотева (2019): Оценка на устойчивостта на основните подотрасли на българското селско стопанство, Икономика и управление на селското стопанство, 2, 34-50.

Башев Х., Б. Иванов, Д. Тотева (2019): Оценка на социално-икономическата и екологична устойчивост на аграрните екосистеми в България, Икономическа мисъл, бр.2, 33-56.

Башев Х., Б. Иванов, Д. Митова, П. Маринов, К. Тодорова, А. Митов (2020): ПОДХОД ЗА ОЦЕНКА НА УПРАВЛЕНИЕТО НА УСЛУГИТЕ НА АГРОЕКОСИСТЕМИТЕ В БЪЛГАРИЯ, ИАИ – София.

Башев Х. (2020): ПОДХОД ЗА АНАЛИЗ И УСЪВЪРШЕНСТВАНЕ НА УПРАВЛЕНИЕТО НА УСЛУГИТЕ НА АГРО-ЕКОСИТЕМИТЕ, Икономика и управление на селското стопанство, бр. 3, 27-48.

Башев Х. (2020): ДЕФИНИРАНЕ, АНАЛИЗИРАНЕ И УСЪВЪРШЕНСТВАНЕ НА УПРАВЛЕНИЕТО НА УСЛУГИТЕ НА АГРО-ЕКОСИТЕМИТЕ, Икономическа мисъл, бр. 4, 3-30.

Башев Х., Б. Иванов, Д. Митова, И. Боевски, П. Маринов, А. Саров, Д. Цвяткова, К. Костенаров, Д. Ванев (2021): МЕХАНИЗМИ И ФОРМИ НА УПРАВЛЕНИЕ НА АГРОЕКОСИСТЕМНИТЕ УСЛУГИ В БЪЛГАРИЯ, ИАИ.

ИАОС (2020): Екосистеми и екосистемни услуги, Изпълнителната агенция по околна среда (ИАОС).

Йорданов Я., Д. Михалев, В. Василев, С. Братанова- Дончева, К. Гочева, Н. Чипев (2017): Методика за оценка и картиране на състоянието на земеделските екосистеми и техните услуги в българия, ИАОС.

Казакова Я. (2016): Земеделие с висока природна стойност (обучение, иновации, знания), УНСС.

Недков С. (2016): КОНЦЕПЦИЯ ЗА Екосистемни услуги, Презентация, работна среща 31 май 2016г.

Николов С. (2018): Екосистемни услуги и тяхното оценяване – кратък преглед, Journal of the Bulgarian Geographical Society, Volume 39, 51–54.

Тодорова К. (2017): Управление на риска от наводнения чрез екосистемни услуги от земеделските стопанства, Дисертация, УНСС, WWF (2019): Екосистемите и техните „услуги", WWF.

Чипев Н., Св. Братанова - Дончева, К. Гочева, М. Жиянски, М. Мондешка, Я. Йорданов, И. Апостолова, Д. Сопотлиева, Н. Велев, Е. Рафаилова, Й. Узунов, В. Карамфилов, Радка Фикова, Ст. Вергиев (2017): Методологична рамка за оценка и картиране на състоянието на екосистемите и екосистемните услуги в българия ръководство за мониторинг на състоянието и развитието на екосистемите и екосистемните услуги, ИАОС.

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ISBN: 978-625-365-401-6

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Sosyal Bilimler Serisi