



NOVASOIL

INNOVATIVE BUSINESS MODELS FOR SOIL HEALTH

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Integrated production in the vineyards - NBU



Project Consortium

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2	LEIBNIZ-ZENTRUM FUER AGRARLANDSCHAFTSFORSCHUNG	GE
3	ZEMNIEKU SAEIMA	LV
4	NEW BULGARIAN UNIVERSITY	BU
5	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	FR
6	KOBENHAVNS UNIVERSITET	DK
7	TECHNISCHE UNIVERSITAET MUENCHEN	GE
8	ASSEMBLEE DES REGIONS EUROPEENNES FRUITIERES LEGUMIERES ET HORTICOLES	FR
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1 Background, focal question and needs

The potential of the business model “Integrated production in the vineyards with vinery and rural tourism” is of great importance for increasing production efficiency, reducing marketing costs and increasing competitiveness in rural areas. On the other hand, many ecosystem functions and services can be provided, such as water and nutrient cycling, biodiversity, economic viability, etc.

The environmental challenges and socio-economic setting are two very important focal points to be considered. From environmental perspective there are two major focus points. On one hand, these are the climatic conditions which are even more exacerbated from climate change – floods, droughts, landslides, hurricane winds, hail storms. The increased frequency of heavy rain storms characterized by high intensity and short duration, will lead to an increase in the short-term superficial runoff and risk of increased water erosion on slopes. Although, most of the aforementioned events are of pure natural character and are difficult to be foreseen and controlled, they put a pressure on the everyday operations. On the other hand, agricultural practices may lead to soil erosion, which is one of the biggest soil problems in Bulgaria. Regarding the socio-economic context, of great importance is the rural population, the migration processes (from villages to big cities), as well as the lack of working force. As a result of the constant outward migration, the population in rural areas is characterized by an unfavorable coefficient of age dependence. In 2020, barely 6.4% of Bulgarian farmers are under 35 years old, with the share of people over 65 years exceeds 25%. In 2050, the working age population is expected to decrease by 40%.

To overcome these obstacles, there are different approaches like:

✓ **Vertical integration of local, regional and traditional wine sector**

The benefits of local traditional and regional products and their positioning in the local market are multifaceted - short transport distances that reduce the negative effect on the climate and the environment, as well as high food quality for consumers, revitalization and support of the regional economy. The importance of sourcing such products is becoming increasingly important given new challenges related to health, changes in tourist attitudes, climate change, food security and other factors. Therefore, it is necessary to strengthen the development potential of local traditional and regional products through their protection and promotion at the national level. This will expand the base for the development of this segment both locally, regionally and nationally, and will be a good basis for the approval of new products with potential for protection under European quality schemes.

✓ **Conservative agricultural practices targeting soil health and reducing erosion**

As part of the Strategic agricultural policy there are different measures that can help to overcome this problem, such as:



- ✓ Building of ecological infrastructure – including, but not only, hedges or rows of trees, terraces;
- ✓ Preservation of soil potential through intermediate non-productive crops and waste biomass;
- ✓ Maintenance of buffer strips occupied by natural vegetation at the edges of agricultural areas, use of vegetative mass (branches and vine shoots - mulch) during pruning.

2 Policy mix

2.1. Introduction

This section provides an overview of soil related policies and institutional setting interesting soils in the national context. This will enable us to take stock of the extent to which soil health is taken into account in the various public policies and to identify the instruments that have been used to do so.

For identifying and understanding the political and institutional setting regulating soil health in the Bulgarian case study the NBU-team conducted in the second half of March 2024 with 9 key stakeholders. Two stakeholders are belong to a group of state administration on national level. We conducted the interviews on site in their offices in Sofia. The other seven key stakeholders are from different groups, located in the case study region Plovdiv: NGO / Wine grower and chairman (National Association of Bulgarian Vine growers); Advisory service / head of the regional office (Executive Wine Agency, Plovdiv); Chairman of a cooperative / Wine grower (Vine-Growing Cooperative "Brestoviza", Brestoviza); Industry and supply chain actors, Researchers, Consultant (Agricultural Credit Cooperative "Solidarnost", Plovdiv).

2.2. Analysis of the current main legal framework related to soils health

Around 200 European documents dealing with environmental protection issues have been agreed and strategies, laws, regulations, national programs and plans related to sectoral policies affecting soils have been developed. Until now attention has been paid to the policies regarding the use and management of natural resources concerning water, air, and climate. Soil protection and health is an integral part of the country's overall environmental protection policy. Despite the fact that soil is a component of the environment, and that it is inextricably linked to water protection, air cleanliness and waste management, soil is still receiving insufficient attention.

The main legal acts related to soil cultivation and health are the Soil Act, Agricultural Land Protection Act and the Environmental Protection Act.

The **Soils Act** is a framework law for the protection of soils and their functions, their sustainable use and restoration as component of the environment, referring to the following principles: ecosystem and integrated approach; sustainable land use; priority of preventive control to prevent or limit damage



to soils and their functions; application of good practices in the use of soils; the polluter pays for the damage caused; awareness of the public about the ecological and economic benefits of soil protection from damage and about the measures for their protection. The framework law on soils determines the competent authorities and defines their competences in the implementation of the state policy on conservation, sustainable use and restoration of soils at the national, regional and local level. However, what has been established since the entry into force of the law is related to the coordination and implementation of a unified policy by the various competent authorities. It was not created and does not function, according to Art. 5, para. 5 of the law, Consultative Council for Conservation, Sustainable Use and Restoration of Soils.

The **Agricultural Land Protection Act** regulates the protection from damage, restoration and improvement of the fertility of agricultural lands and defines the conditions and procedure for changing their purpose. This law focuses mainly on protecting the functions of agricultural land in agriculture. Chapter three "Restoration and improvement of the productive qualities of agricultural lands" presents and controls the violations of these lands from industrial, urbanization and other anthropogenic nature. In the execution of projects, it is acceptable, under certain circumstances, to introduce a requirement for the assessment of the risk of erosion processes.

The **Environmental Protection Act** regulates the state conservation policy of the environment and its integration into sectoral policies. The Environmental Protection Act is a framework law that regulates the basic provisions and principles of the management of public relations related to environmental protection. In Section III Conservation, sustainable use and restoration of soils of Chapter three (Protection and use of environmental components and waste management) all topics related to conservation, sustainable use and restoration of soil are included, which guarantee effective protection of human health and soil functions, bearing in mind that soil is a limited, irreplaceable and practically non-renewable natural resource. Obligations arising from international commitments and those from EU Directives are transposed and applied in the Environmental Protection Act and the by-laws issued on its basis. In the Environmental Protection Act, not only the basic provisions and principles of management related to environmental protection are regulated, but they are introduced as preventive tools and procedures for the ecological assessment and environmental impact assessment, complex permit regimes, environmental responsibility, management and financing

The National Program (2020-2030) is a program document with defined goals, priorities and measures for the practical application of the state policy for the protection of soil resources at the national, regional and local level. This program is developed on the basis of Art. 24, paragraph 1 of the Law on Soils (Promulgated SG No. 89 of November 6, 2007, amended SG No. 98 of November 28, 2018) and on Art. 77 of the Environmental Protection Act. It covers a 10-year implementation period and includes a five-year action plan.



The goal of the National Program is the protection of soil resources and their sustainable use, as well as the implementation of good practices to prevent soil damage.

- The soil protection policy in Bulgaria is based on the following principles:
- ecosystem and integrated approach;
- sustainable use of soils;
- preventive control to prevent or limit damage to soils and their functions;
- implementation of good practices in the use of soils;
- the polluter pays for the damages caused;
- awareness of the public about the ecological and economic benefits of soil protection from damage and the measures for their protection.

Basic criteria for determining the priorities in the National Conservation Program, according to Art. 24, para. 4 of the PA, sustainable use and restoration of soils are:

- Sustainable use of soils as a natural resource.
- Conservation and improvement of soil fertility.
- Reduction of harmful consequences on soils caused by natural processes and phenomena, and anthropogenic factors.
- Prevention and reduction of risk to human health and protection of other components of the environment.
- Compliance with the principles of sustainable development, including the principles of organic farming.
- Restoration of disturbed soil functions.
- Obligations assumed by the state under international acts relating to soils.

In addition, there are numerous regulations, programs and measures related to soil health governance.

2.2.1. Stakeholders' opinion and evaluation of the current main legal framework related to soils health

The stakeholders at the national level stated that the main activities of the soil protection are related to the harmonization of the Bulgarian legislation with the regulations of EU in the field of conservation, sustainable use and restoration of land and soils; participation in the elaboration of documents at European level; development of legislation, strategies, programs, assessments and analyzes; coordination of activities of the commitments under the UN Convention on Desertification Combat, National Strategy and Action Plan to combat desertification and land degradation and measures for their implementation; implementation of preventive, current and ex-post control over the implementation provisions of the Soil Act and regulations.



The stakeholders at the national level pointed to the National Program for the Conservation, Sustainable Use and Restoration of Soil Functions (2020-2030) as a foundational document related to soil health.

The Bulgarian statutory legal framework is harmonized according to the requirements of the European soil health policy and provides the legal basis for the implementation of EU policy in this area. It formulates both the general principles of this policy and the specific activities for the protection and sustainable use of soil health. The Regulations introduce standards for the protection of soil from pollution, for the reclamation of disturbed lands and for conducting surveys and inventories of contaminated soil areas, which meet the requirements of the EU's soil health policy.

According to all stakeholders, in the existing legal framework related to soil health, there are insufficient preventive measures in relation to agricultural soils that are not affected by degradation processes or have undergone degradation to an insignificant degree, e.g. the engineering and technical anti-erosion measures. In this direction, it is necessary to have more incentives, as well as to make soil health a significant national priority. All stakeholders expressed the opinion that the implementation of the legal framework related to soil health in our country faces certain difficulties in terms of awareness. Hard work is needed in this direction. According to them, the National Program can support central and local authorities, oriented to the preparation of projects financed by national and European funds, whose main task is the protection and sustainable use of soils.

The stakeholders at the local level were not familiar with the current legal framework related to soil health in detail. An exception is the representative of Executive Wine Agency, Plovdiv.

2.3. Governance structures related to soil health

In addition to the legislation related to soil health, a number of regulations have been drafted that make the base of soil health governance.

By the law, the policy on soil and soil health is divided under the Ministry of Agriculture and Food (MAF) Ministry of Environment and Water (MEW) and Ministry of Regional Development and Public Works and their regional/local authorities as well as regional governors and mayors.

MAF conducts the policy of supporting "environmentally friendly" activities. The Rural Development Program as a part of CAP supports and financially stimulates (through financial opportunities under both pillars through subsidies/compensatory payments) activities in agriculture and rural areas related to environmental protection, including soil health.

MEW carried out the general policy on soil and soil health soil protection, assisted by Directorate Waste management and soil protection, in accordance with EU and national legislation.



The **Advisory Board on Conservation, Sustainable Use and Restoration of Soils** has an important role in the coordination of the many ministries, departments, organizations and national programs that are relevant to soils health.

2.3.1. Stakeholders' opinion and evaluation of the current governance structures related to soil health

The stakeholders at the national level pointed that soil health is sufficiently represented in Bulgarian legislation. Its practical implementation faces a number of difficulties in terms of awareness and willingness to comply. The public must understand the importance of actions and measures to protect the components of soil health. In this direction, it is necessary to work hard, especially with the large operators and tenants, in order to realize the need to preserve the functions of the soil.

However, there are still cases of unregulated disposal of construction waste outside the specially designated sites for their disposal, contaminating cultivated areas or temporarily uncultivable ones, which practically become unusable until they are cleaned, which is an expensive operation.

According to them, a significant number of stakeholders are not sufficiently engaged in the development of the normative and legislative framework related to the protection and health of soils. The adoption of agro-ecological measures is related to improving the awareness, training and consultation of agricultural producers regarding the requirements for sustainable soil management. It is appropriate to finance pilot and demonstration projects related to the implementation of agricultural activities aimed at soil health.

The rest of the interviewed key stakeholder (exception the Executive Wine Agency, Plovdiv) from the case study region Plovdiv were not thoroughly familiar with the legal framework and governance structures related to soil health. However, they possess considerable local knowledge related to the day-to-day operations of soil health, which they shared with our team and is specifically reflected in Table 1.

All stakeholders expressed the opinion that the conducted interviews were very useful for them and gave them additional knowledge. They focused their attention on soil health from different perspectives. In addition, getting acquainted with the definition of soil health, they realized the multifaceted and multifunctionality of this concept.



Table 1 Key elements of national **policy mix and institutional framework around soils**, based on and adapted from Rogge and Reichardt, 2016; Williamson, 2000.

Domains	Elements to consider	Description	Lickert (1-5)	
			P ₁	Q ²
0.Awareness and understanding	Definition of soil health	Utilitarian, functional, essential living system	2	3
1.Policy concern	Soils as policy priority	Partially significant priority	3	2
2.Policy agenda on soils	Political commitment towards soil health, non-binding targets	Formal political commitment to implement and comply with EU regulations related to soil health	3	2
3.Institutional environment	Binding national regulations on soil	Agricultural and environmental policies, CAP, Direct payments, Measures 10 and 11	4	3
4.Policy integration	Interactions between and within policy sectors	Weak integration between and within policy sectors. Lack of a specialized structure in the MAF and MEW	2	2
5.Governance structures	Levels of governance involved, roles and functions	MAF, MEW, Ministry of Regional Development and Public Works and their regional/local authorities. No clear distributions of roles and functions between the involved ministries and their regional/local authorities. Exception State Fund "Agriculture"	3	2
6.Contracts	Property rights enforcement	Different contractual arrangements for land tenure and ownership. They formally take into account soil health, but very limited in	3	2

¹ P=priority. Please rank accordingly to 5 point-Likert scale based on how these elements are currently considered in your case study: 1 no priority; 2 low priority; 3 neutral; 4 moderate priority 5 high priority

² Q=quality. Please rank accordingly to 5 point-Likert scale based on the current quality of the political process in your case study: 1 very poor -2 poor; 3 acceptable; 4 good 5 very good



	, land tenure agreements	practice, Exceptions are contracts concluded by municipalities		
7.Validation and coherence	Mechanisms in place to measure impacts and ensure compliance to targets and limits	Minor monitoring on validation and coordination mechanisms in place to ensure that objectives for soil health are reached. Exception State Fund "Agriculture"	3	2
8.Non-governmental actors	Role of different actors and multi-stakeholder coordination	NGO-s, Cooperatives and associations are quite active	4	4
9.Allocation of resources and sources of finance	Available budget for soil health and blended finance	Subsidies from programs operated by Paying agency	4	3
10.Policy consistency with soil health	Synergies and trade-offs between policy sectors and towards soil ES	Synergies and trade-offs between policy sectors should be more intense	3	2
11.Contextual factors	Enabling and disabling conditions	1. NGO and other stakeholder' initiatives, Changing the customer model towards a healthy and environmentally friendly life, Significant tradition in vine and wine, EU soil policy. 2. Political instability and volatility, Alienation of the landowners from their land	2	2

3 Policy directionality

Aim of this section is to assess how existing instruments (regulatory and economic) put in place by the national policy mix are able to support business models for soil health. Policy instruments constitute the concrete tools to achieve overarching objectives and are usually associated with specific goals, i.e. the intended effect of instruments on the medium-long term. Furthermore, policy narrative are defined as the key words and concepts that express the political understanding of a problem, i.e. soil health.



3.1 Instruments

Table 3 Assessment of **policy instruments** (adapted from Rogge and Reichardt, 2016)

PRIMARY TYPE	PURPOSE TYPE		
	Supply	Demand pull	Systemic
Economic instruments	<p>Strategic plan 2023-2027:</p> <ol style="list-style-type: none"> Intervention for encouraging cooperation for short supply chains Strategic plan 2023-2027 – Investments in the viticulture sector 	<p>Strategic plan 2023-2027:</p> <ol style="list-style-type: none"> Eco-scheme for perennial crops Eco-scheme for developing ecological infrastructure 	<p>Strategic plan 2023-2027:</p> <ol style="list-style-type: none"> Implementation of cooperation activities that aim at strengthening of regional potential and local product
Regulations	<ol style="list-style-type: none"> Law on the ownership and use of agricultural lands Law for soils The National Program for Conservation, Sustainable Use and Restoration of Soil Functions (2020 – 2030 r.) 	<ol style="list-style-type: none"> Handbook for practical application of the conditions for the maintenance of the land in good agricultural and ecological condition in Bulgaria Technologies and innovative solutions for agriculture, ecology and protection of soil resources Integrated system for remote determination of the state of crops of agricultural crops 	Environmental protection law
Information	<ol style="list-style-type: none"> Increasing awareness and information about quality regional products via promotional campaigns under the National Program for 	Development of web-based platform aiming at increasing awareness of short value chain and organizing wine tourism under the National Program for local and traditional product 2022-2032	Encouraging cooperation between producers of regional and local food under the National Program for local and



	local and traditional product 2022-2032		traditional product 2022-2032
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PRIMARY TYPE	PURPOSE TYPE		
	Supply	Demand pull	Systemic
Economic instruments	1. Farmers 2. Yes 3. Yes 4. Penalties Yes	1. Farmers 2. Yes 3. Yes 4. Penalties Yes	1. Farmers 2. Yes 3. Yes 4. Penalties Yes
Regulations	1. Farmers 2. Yes 3. Yes 4. No sanctions Both direct and indirect	1. Farmers 2. Yes 3. Yes 4. No sanctions Both direct and indirect	1. Farmers 2. Yes 3. Yes 4. No sanctions Both direct and indirect
Information	1. Farmers/producers (processing of traditional products)/customers 2. Yes 3. No 4. No Indirect	1. Farmers/producers (processing of traditional products)/customers 2. Yes 3. No 4. No 5. Indirect	1. Farmers/producers (processing of traditional products) 2. Yes 3. No 4. No 5. Indirect



3.2 Policy narrative

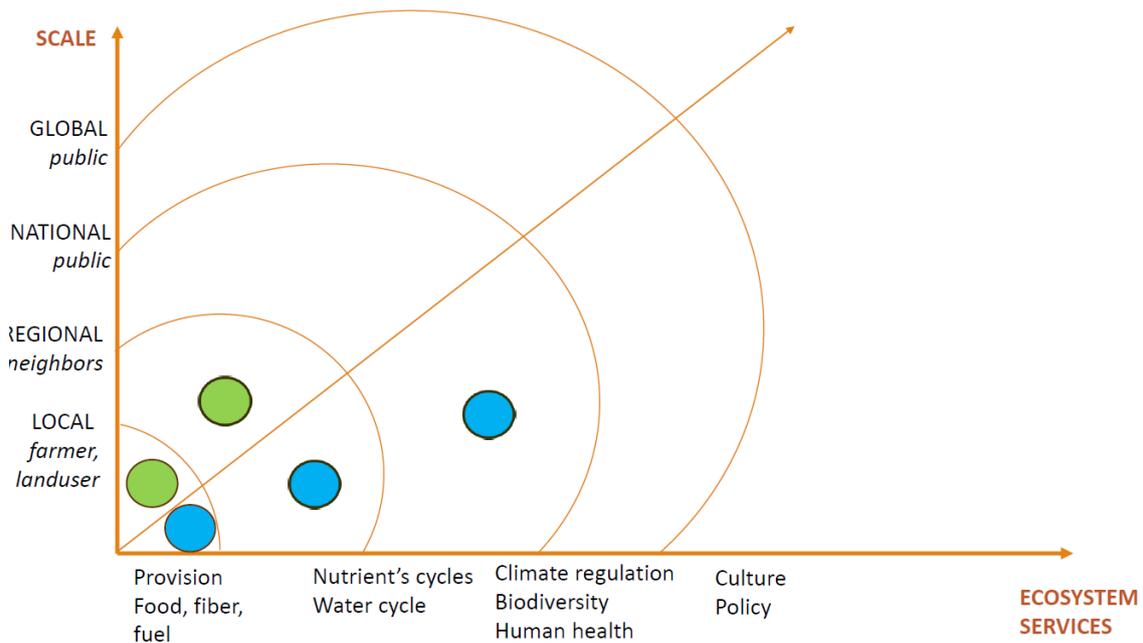


Figure 1 Mapping of ES of the BG CS

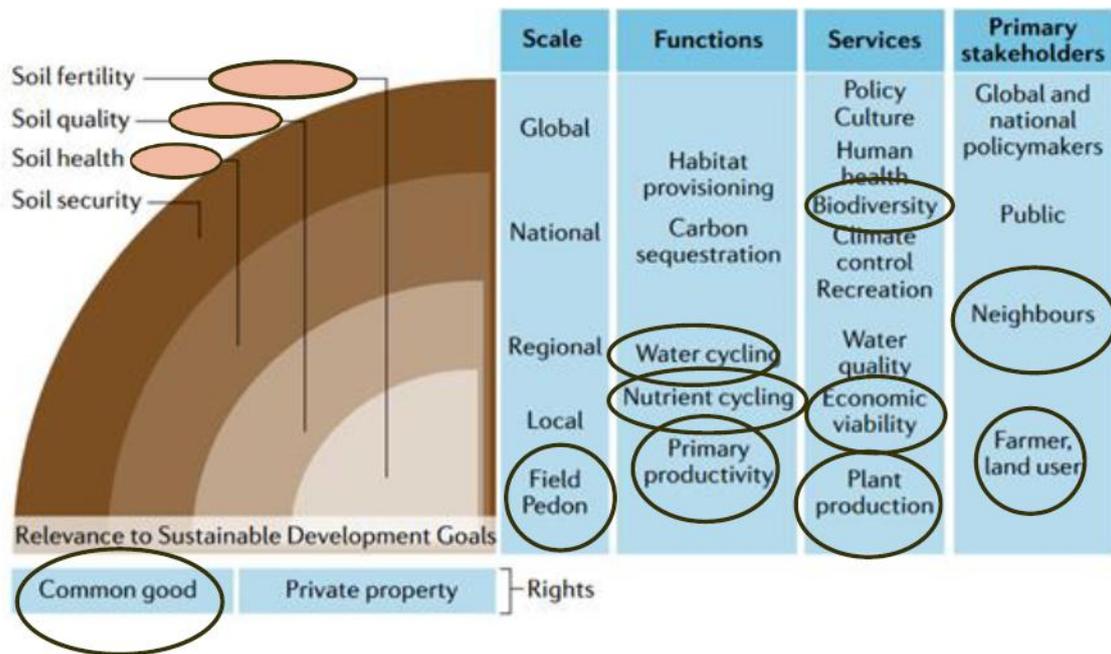


Figure 2 Mapping of soil health for BG CS

Table 4 Description of the policy narrative (based on Lehmann et al, 2020)

Policy narrative (and scale of action)	Policies and incentives in place	Management strategies applied	Soil functions interested	Ecosystem services addressed
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Field pedon	<ul style="list-style-type: none"> ✓ Property use rights ✓ Subsidies ✓ Responsible sourcing of agriculture products and services ✓ Direct Payment for Ecosystem Services ✓ Rewards for Ecosystem Services 	Improving soil health and producing quality grapes suitable for the production of traditional wines enjoyed by tourists visiting the area	<ul style="list-style-type: none"> ✓ Water cycles ✓ Nutrient cycling ✓ Primary production 	<ul style="list-style-type: none"> ✓ Biodiversity ✓ Economic viability ✓ Plant production
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4 Mapping exercise

4.1 Synthesis of the value mapping

a. Value proposition (look at pentagonal problem)

- **What are the causes of degradation?**

Soil erosion: Cinnamon forest soils are mainly those on which vines are grown. They are located in the hills and low mountains territories on the area with oversea height up to 800 m. The content on hummus varies in wide borders. Typical for this soil is that at drying up them strongly everything they are sleeping. In the district there are located two subtype on the cinnamon forest soils - typical and leached. The leached cinnamon soils are strongly distributed in the area. It is typical for them that these soils are strongly affected from erosive processes, especially in hilly and semi-mountainous areas regions. The soil them profile is fine shaped and with a large depth. Leached cinnamon forest soils have higher content on clayey particles, as opposed to the typical ones, which leads to saturation and retention on water at precipitation. These processes worsen soil aeration.

- **What are the socio-technical solutions proposed (BM)?**

At the case study level, the selected farmers are farmers with participation at the Program for local traditional and regional traditional products for the period 2021-2023 is to value the potential of local traditional and regional traditional products in the wine sector and strengthen their relationship with communities in order to develop the local economy and agricultural sector. Building **vertical integration**: The vertical integration has significant contribution for raising efficiency on production and for lowering marketing expenses and increasing the competitiveness.



- **Why do soils matter in the BM?**

Water erosion: The increased frequency of heavy rainstorms characterized by high intensity and short duration will lead to an increase of the short-term surface runoff and risk of increased water erosion of soil on slopes.

- b. Value creation and delivery**

- **What soil ES are targeted by the business model? (list based on soil strategy)**

- provide food and biomass production, including in agriculture and forestry; absorb, store and filter water and transform nutrients and substances, thus protecting groundwater bodies; provide a physical platform and cultural services.

- **What soil ES are not provided / neglected?**

provide the basis for life and biodiversity, including habitats, species and genes; act as a carbon reservoir; constitute an archive of geological, geomorphological and archaeological heritage who benefits from them.

- **Public/private - who can benefit from that values?**

optimization of fertilization according to the condition of the soil from the point of view of nutrient availability.

- **What trade-offs emerge? Are the causes addressed?**

a change in the wine regulation in the direction of increasing the permissible percentage of alcohol in wine to 16 degrees. New regulation for taking soil samples and practicing fertilization in accordance with the availability of the soil and the requirements for the production of quality wine.

- c. Value capture**

- **What soil ES are targeted by the incentives?**

Property use rights; Subsidies, Responsible sourcing of agriculture products and services, Direct Payment for Ecosystem Services; Rewards for Ecosystem Services.

- **How is value distributed along the stakeholders?**

optimization of fertilization according to the condition of the soil from the point of view of nutrient availability, wineries, cooperation entry and exit, agro and wine tourism.

- **Where do the resources come from (public/private)?**

Public/Private.

- **How is soil health described and framed by the business model? (place in the picture)**



4.2 Solution mapping synthesis

We divided the participants into two groups. The first group discussed issues related to innovation, and the second to regulations.

Question 1: INNOVATIONS

- a. *What innovations and changes are we looking for?*
- ✓ Products - non-alcoholic wines, dessert wines and drinks, blue wines, liqueurs, blended wines;
 - ✓ Technologies - improvement of agricultural techniques in the vineyards, new pruning's, drip irrigation;
 - ✓ Services – agritourism;
 - ✓ Infrastructure - improvement of roads, pruning of vineyards;
 - ✓ Social habits - production of table wines that are more accessible to more consumers;

- b. *How innovative is the socio-economic context?*

Trends:

- ✓ **Social context** - increasing employment, cooperation from the point of view of the realization of the production for export and supply of materials.
- ✓ **Economic context** - efficient use of waste from wine production for spa procedures, combining wine tourism with agritourism
- ✓ **Environment context** - optimization of fertilization according to the condition of the soil from the point of view of nutrient availability

Activities:

- ✓ **Skills** - preparation and training in agro ecology;
- ✓ **Knowledge** - new knowledge on tourism, sommelier and ecology;
- ✓ **Partnership** - incorporating science into the business model;

Question 2: REGULATIONS

- c. *What institutional instruments (e.g. binding regulations, non-binding strategies, new incentives and contractual solutions)*

- ✓ **Regulations** - a change in the wine regulation in the direction of increasing the permissible percentage of alcohol in wine to 16 degrees. New regulation for taking soil samples and practicing fertilization in accordance with the availability of the soil and the requirements for the production of quality wine.
- ✓ **Incentives** - small grape producers to register and declare the produced produce and wine
- ✓ **The contractua solusions** - related to the results (the quality of the grapes to match the quality of the wine)

- d. *What resources (skills, knowledge, partners) are missing?*



- ✓ **Resources** - increasing the skills, level of education of agronomists and technologists for wine production, introduction of curricula related to the region specificity
- ✓ **Knowledge** - international experience
- ✓ **Partners** - connections between farmers and wineries with tour operators

Table 5 Solution mapping

Topic / timescale	SHORT TERM (1 – 3 years)	MEDIUM TERM (3 – 7 years)	LONG TERM (> 7 years, new CAP)
DRIVERS:			
Decreasing of unemployment	x	x	x
Cooperation (input and output)	x		
Agro and wine tourism		x	
Efficient use of waste from wine production			x
INNOVATIONS:			
Spraying fertilizers with drones	x		
Implementation of new ways of pruning the vines		x	
New assortments of wine		x	
REGULATIONS:			
Change in the wine regulation		x	
Ordinance on soil samples		x	
Strategy for new grape varieties/climate changes			x
RESOURCES:			
Improvement of education level			x
Improvement of infrastructure – rural roads		x	

4.3 Pathways mapping

CHANGES: the wine regulation, soil sampling regulation, small grape producers to register, education, road infrastructure

TRENDS/DRIVERS:

- ✓ **Trends** - expanding the assortment of wine, new grape varieties resistant to climate changes, technologies to improve soil health



- ✓ **Drivers** - wineries, cooperation entry and exit, agro and wine tourism, optimization of fertilization according to the condition of the soil from the point of view of nutrient availability

ACTIVITIES/RESOURCES:

- ✓ **Activities** -raising the level of education, introducing performance-based contracts, exchange of experience
- ✓ **Resources** - improvement of village roads, introduction of drones for spraying the vineyards, drip irrigation

Table 4 Pathways mapping

	Short term (up to 3 years)	Medium (3 - 7 years)	Long term (after 7 years)
INNOVATIONS			
Regulations and binding policies		X	
Incentive instruments	X		
Contractual solutions		X	
Infrastructure		X	
Product		X	
Services		X	
Technology		X	
Institutions	X		
Actors' configuration			
Coordination mechanisms and partnerships			
RESOURCES			
skills, knowledge, R&D			X



DRIVERS: social habits, economic, environmental	X	X	X
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