Food and Agriculture Organization of the United Nations

LDN Land Degradation Neutrality Target Setting Programme

STRATEGY

TO ACHIEVE LAND DEGRADATION NEUTRALITY FOR THE PILOT AREA

"SOUTHERN PART OF THE DNIESTER FOREST-STEPPE PLATEAU"

Chișinău 2026

The Land Degradation Neutrality Strategy for the southern part of the Dniester Forest-Steppe Plateau was developed with the support of FAO under the project "Enabling an Environment for Integrated Natural Resource Management and Implementing an Integrated Approach to Achieving Land Degradation Neutrality in the Republic of Moldova" (responsible: Mihai Ojog, Project Coordinator, and Iurie Bejan, executor).

The normative act was developed for 32 communes within the districts of Orhei, Rezina, and Şoldăneşti and has an informative character.

The Strategy was first discussed and approved during the meeting of the Working Group of the United Nations Convention to Combat Desertification (UNCCD) (on 16 April 2025), and subsequently at the meetings of the District Councils of Rezina (07 October 2025) and Orhei (10 October 2025).

The Strategy is accompanied by 32 Local Land Use Action Plans, which were developed in collaboration with Local Public Authorities, discussed within Local Councils, and submitted to each mayoralty for implementation.

The implementation period of the Strategy is 2026–2031.

INTRODUCTION

Land Degradation Neutrality (LDN) represents a state in which the quantity and quality of land resources, necessary to support ecosystem functions and services and to enhance food security, remain stable or increase within specified temporal and spatial scales and ecosystems (Decision 3/COP.12, UNCCD, 2015a).

The concept of Land Degradation Neutrality (LDN) was introduced into the global dialogue by the United Nations Convention to Combat Desertification (UNCCD), recognized by the international community during the Rio+20 Conference in 2012 and adopted as part of the 2030 Agenda for Sustainable Development (UNCCD, 2021a). LDN aims to maintain the land resource base by ensuring no net loss of productive land through a combination of measures that avoid, reduce, and reverse land degradation processes (Fig. 1).

Achieving neutrality requires estimating the likely impacts of land use and land management decisions by offsetting anticipated losses through the strategically planned rehabilitation or restoration of degraded land of the same type (Cowie, 2020). The LDN approach aims to achieve a functional balance between what is taken from the land and what is returned, providing a framework for a balanced approach that considers trade-offs and anticipates new degradation.

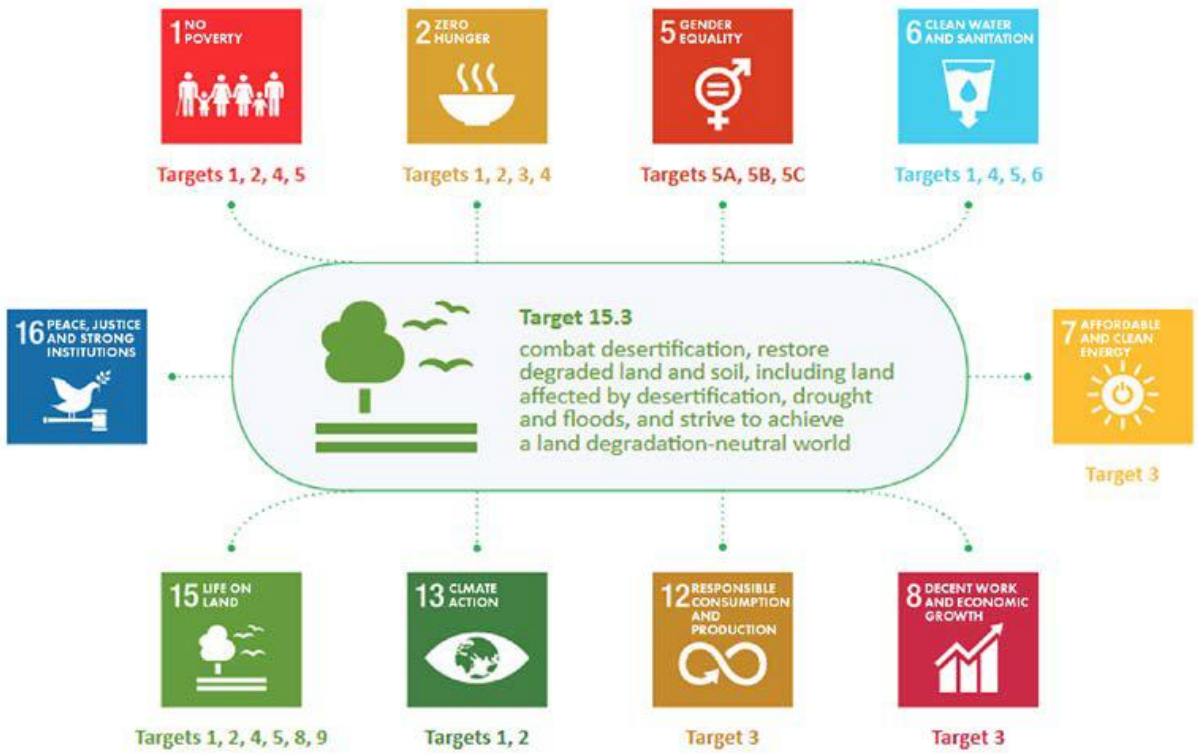


Figure 1. Land Degradation Neutrality – an Accelerator of the Sustainable Development Goals

Source: UNCCD: Overview of Land Degradation Neutrality in Europe and Central Asia, 2022

Policies and programmes aimed at preventing, halting, and reversing land degradation processes have been significantly hindered by the absence of a clear, overarching objective and of time-bound quantitative targets to guide actions and ensure measurable progress. Therefore, the Land Degradation Neutrality (LDN) concept will be integrated into the existing land-use planning framework and the land cadastre system of the Republic of Moldova (hereinafter RM), based on the selected pilot area, with the main objective of strengthening the monitoring capacity of the three global indicators of the UNCCD Convention: land cover/land use, land productivity, and soil organic carbon stocks.

The Land Degradation Neutrality Strategy in the pilot area (the southern part of the Nistru Silvosteppe Plateau — hereinafter the Strategy) was developed based on field-collected data (within the project "Natural and anthropogenic factors, pedo-agrochemical reports and soil degradation processes") and includes recommendations and measures to reduce land degradation, improve soil quality, and enhance environmental protection. The Strategy comprises the following actions:

Management of soil organic carbon (SOC) and improvement of soil fertility through the implementation of zonal crop rotation, cultivation of cover crops, and the use of organic, mineral, and green fertilizers;

*Methods for improving soil fertility (*including for irrigated soils), their rational use, and management of irrigation-related risks such as salinization;

Application of phyto and agro-technical measures to prevent and combat soil erosion, land rehabilitation, improvement of degraded perennial plantations, and planting of shelterbelts to reduce wind erosion and conserve soil moisture.

The Strategy is based on the provisions of Sustainable Development Goal (SDG) 15 of the United Nations — the protection and restoration of terrestrial ecosystems, sustainable forest management, combating desertification, halting land degradation, and biodiversity loss. Among the nine targets set under SDG 15, "Target 3" is a priority for the Republic of Moldova, which calls for combating desertification, restoring degraded land and soil, including land affected by desertification, drought, and floods, and striving to achieve Land Degradation Neutrality.

The Strategy includes objectives and lines of action that contribute to the implementation of environmental goals and priorities established in national medium- and long-term strategies and programmes, which address various aspects of agricultural development and the protection and management of soil resources (Table 1).

Table 1. List of national policy and planning documents in the field of Land Degradation Neutrality (LDN)

Planning framework	Date of approval
Environmental Strategy for 2024-2030 and Action Plan for its implementation	Approved by Government Decision (GD) No. 409 of 12.06.2024
Climate Change Adaptation Programme until 2030	Approved by Government Decision (GD) No. 624 of 30.08.2023
Programme for Forest Expansion and Rehabilitation for the period 2023–2032 and its Action Plan for implementation during 2023–2027	Approved by Government Decision (GD) No. 55 of 17.02.2023
National Strategy for Agricultural and Rural Development 2023–2030	Approved by Government Decision (GD) No. 864/MAIA/2022
Strategic Programme of Agricultural Policy for 2026–2030	Under approval
National Disaster Risk Reduction Programme until 2030	Under approval
Biodiversity Programme for 2026–2030	Under approval
National Programme to Combat Desertification and Land Degradation for the period 2026–2030	Under approval

The Environmental Strategy 2024–2030, under the component on soil resource protection, provides for:

- the promotion of good agricultural practices for the prevention and control of soil degradation;

- the implementation of sustainable soil resource management measures, including reducing soil salinization or acidification (including as a result of improper use of irrigation systems);
- the restoration of degraded land and soils through the implementation of afforestation programmes; the restoration of land affected by desertification, drought, and floods;
- the promotion of organic agriculture, etc.

The Strategy provides for the development of a programme on combating desertification, restoring degraded land and soils, and land affected by desertification, drought, and floods, as well as measures to combat soil degradation and desertification, in line with the provisions of the UN Convention to Combat Desertification (UNCCD).

The main targets of the Environmental Strategy in the field of soil resource protection include the implementation of land improvement (amelioration) projects on an area of 10,000 ha and the planting of protective forest belts on an area of 3,000 ha.

The Climate Change Adaptation Programme until 2030 provides for a set of actions aimed at adapting the agricultural sector by:

- the implementation of conservation agriculture systems and the use of direct seeding (no-till);
- systematic improvement of crops, including the development of drought-tolerant varieties and hybrids;
- aligning the use of mineral fertilizers with actual climatic conditions;
- changing crop structure in line with climatic realities;
- improving the agricultural risk insurance system;
- expanding water-efficient irrigation technologies;
- preventing soil erosion through the planting of shelterbelts composed of species adapted to local climatic conditions;
- improving the agricultural subsidy system by introducing requirements for farm compliance with integrated environmental management and climate resilience measures;
- harnessing the potential for climate change adaptation (through skills, knowledge, and remittances), taking into account the impact of migration on human resources in rural areas.

The Programme for Forest Expansion and Rehabilitation for the period 2023–2032 sets the achievement of the following results:

- increasing forest cover to 15% of the country's territory;
- reconstruction of forest plantations on an area of 110,000 ha;
- rehabilitation of 35,000 ha of degraded land;
- reduction of the area of degraded land by 45,000 ha;
- reduction of the area of severely eroded land by 15,000 ha;
- afforestation of 15,000 ha of riparian protection belts;
- reducing soil erosion processes and protecting approximately 350,000 ha of agricultural land through the creation/rehabilitation of 10,000 ha of shelterbelts for agricultural fields.

The Strategic Programme of Agricultural Policy for 2026–2030 includes among its planned specific objectives the contribution to climate change mitigation and adaptation, including through the reduction of greenhouse gas emissions and the enhancement of carbon sequestration capacity, as well as the promotion of sustainable energy and the efficient management of natural resources such as water, soil, and air, etc.

The National Agricultural and Rural Development Strategy 2023–2030 sets out the following objectives in the field of land resource protection:

- modernization of the crop production sector through the application of climate-resilient technologies;
- adoption of practices for the efficient use and management of water resources and the expansion of irrigation to ensure climate resilience;
- support and strengthening of environmental protection through the use of environmentally friendly techniques (biological control, conservation and regenerative practices, etc.);
- conservation of biodiversity and protection of water and soil resources;
- promotion of rural business development by supporting family farms, increasing incomes, and expanding employment opportunities in rural areas;
- development of targeted programmes to encourage the investment of remittances in rural businesses, integration of returning diaspora members, and the creation of enabling institutional conditions;
- encouragement of population engagement in rural community development.

The National Programme for Disaster Risk Reduction (2026–2030) will have a significant impact on the capacity of the Republic of Moldova to prevent, anticipate, manage, and mitigate the effects of natural disasters on the environmental sector. This programme will directly contribute to strengthening the resilience of ecosystems, ecological infrastructure, and environmental institutions in the face of increasing risks caused by climate change, soil degradation, and pollution.

The Biodiversity Programme will contribute to the conservation and sustainable use of terrestrial ecosystems, sustainable forest management, combating desertification, restoring degraded land and soils, including land affected by desertification, drought, and floods, developing green infrastructure, conserving and protecting wetlands, ensuring ecosystem conservation, supporting research in the field, promoting sustainable forest management, eliminating abusive deforestation and illegal logging, and transitioning towards a circular economy. Among the actions directly related to achieving Land Degradation Neutrality are the ecological restoration of degraded ecosystems to cover at least 10% of degraded land and the expansion of protected natural areas to 8% of the country's territory.

The National Programme for Combating Desertification and Land Degradation for the period 2026–2030 aims to improve the quality, protection, and sustainable use of soil resources. Its specific objectives include:

- strengthening the education system and scientific support in the field of soil conservation and sustainable use, as well as drought management;
- improving soil quality;
- protecting and ensuring the sustainable use of land resources;
- mitigating, adapting to, and managing the effects of drought to enhance soil productivity.

Most of the regulatory acts place emphasis on afforestation activities, while some also support environmental education and professional training initiatives. A key aspect is the identification of the financial resources required for the implementation of the planned actions.

To ensure the implementation of the Strategy's specific objectives and action directions, local action plans have been developed. These plans include an analysis of the local situation and priority areas of intervention, specific environmental objectives, implementation measures and activities, monitoring and evaluation of progress, required resources and estimated budgets, stakeholder involvement, etc. These components are essential for the coordinated and efficient implementation of

the Strategy's objectives, ensuring appropriate adaptation to local conditions and needs.

CHAPTER I. SITUATION ANALYSIS IN THE PILOT AREA

SECTION 1. DESCRIPTION OF THE AREA

1. General characteristics

The pilot area is located in the north-eastern part of the country, covering the southern part of the Nistru Silvosteppe Plateau (the interfluve between the Nistru River and the Cogâlnic and Răut rivers).

The total area of the pilot region is 960.6 km² and includes 32 communes from the Orhei district (20 communes), Rezina district (11 communes), and Șoldănești district (1 commune) (Fig. 2).

The total population, according to usual residence as of 1 January 2024, was 39,792 inhabitants, including 48.6% men and 51.4% women.

The average elevation in the area is 176 m, ranging from 20.9 m (Trebujeni commune) to 323.6 m (Răspopeni commune) (Fig. 3). The average slope of the land is 5°, however, approximately 42% of the territory has steeper slopes, including 7% exceeding 10° (Fig. 4).

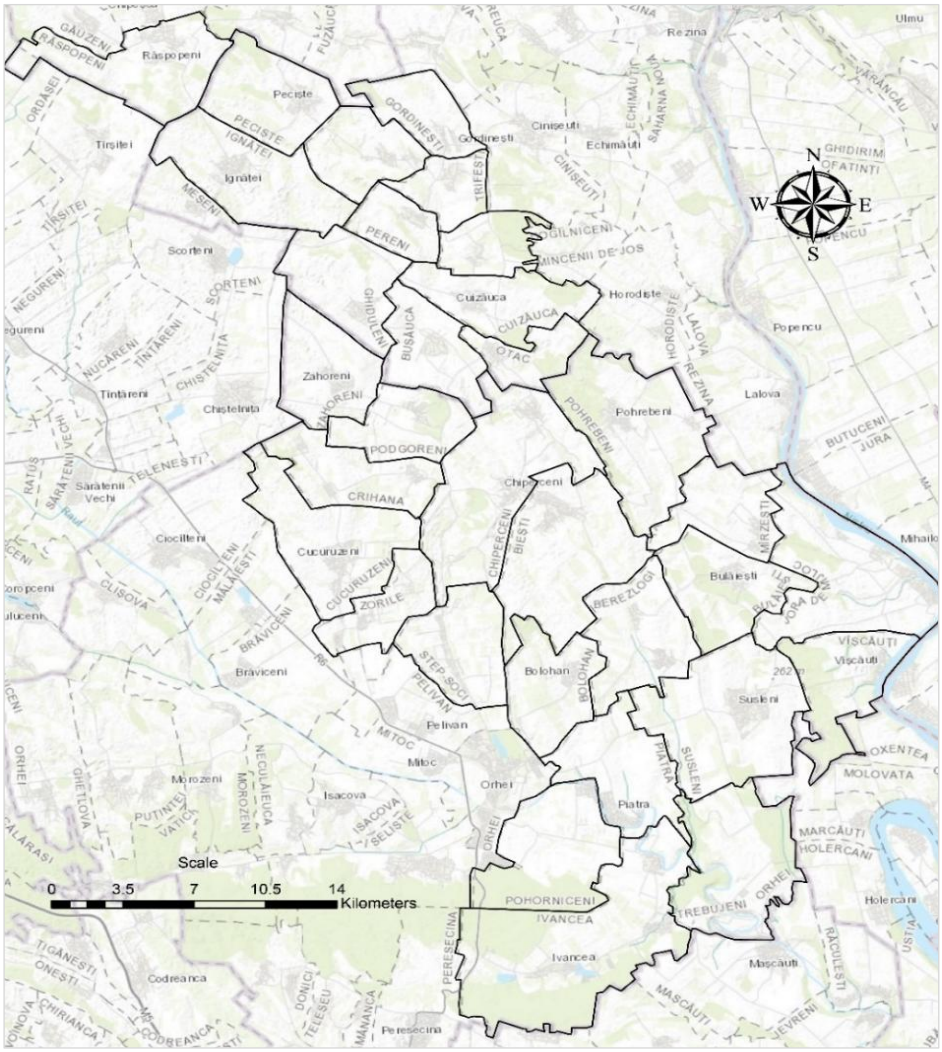


Figure 2. Pilot area

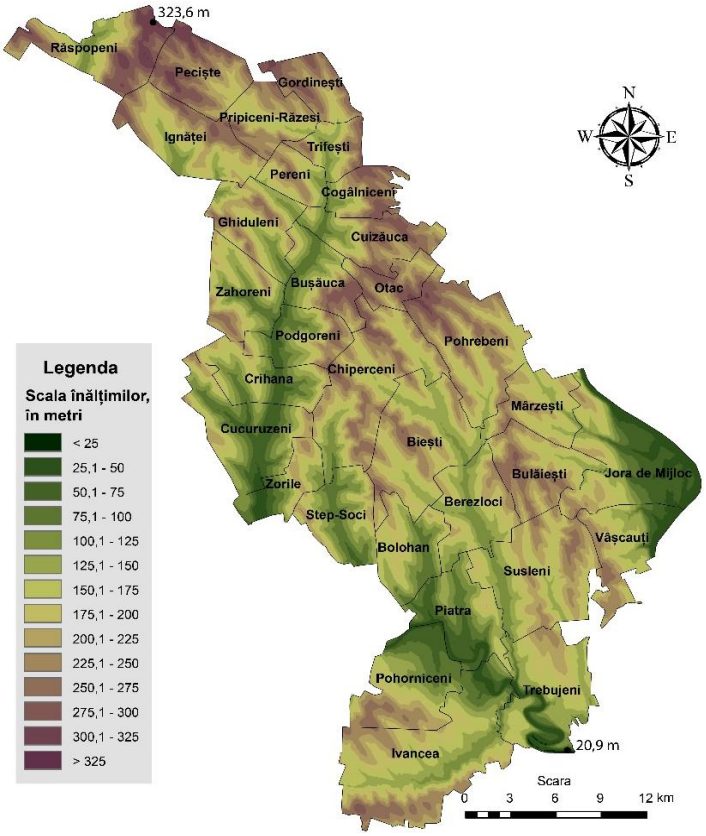


Figure 3. Elevation

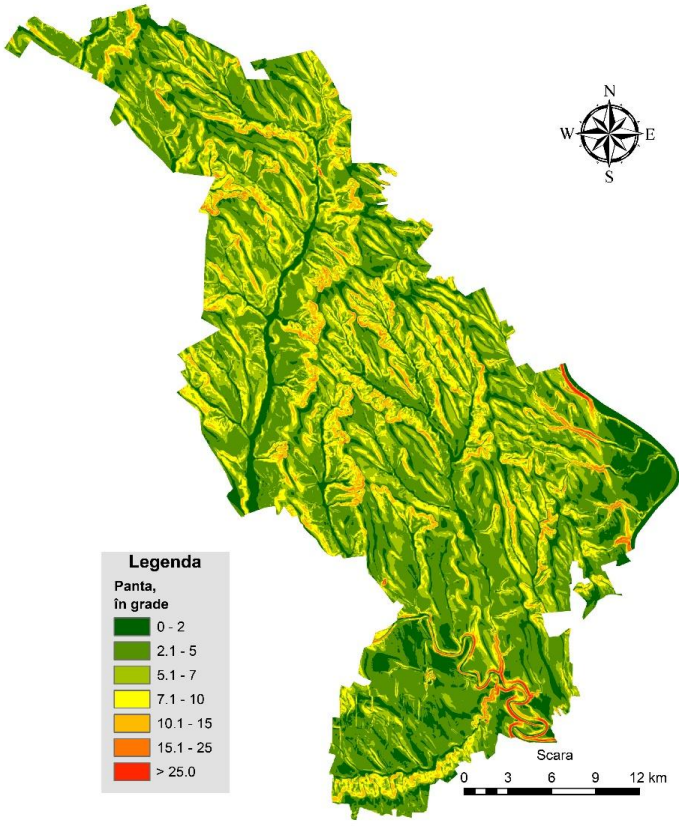


Figure 4. Slope map

2. Climate conditions

The specific *climate conditions* are determined by geographical factors of climate formation, which include the dynamics of air masses, driven by the seasonal activity of baric centres and solar radiation, the values of which are largely influenced by latitudinal zonality. For analysis and synthesis, data from the State Hydrometeorological Service for the period 1991–2025 were used (Fig. 5 and 6).

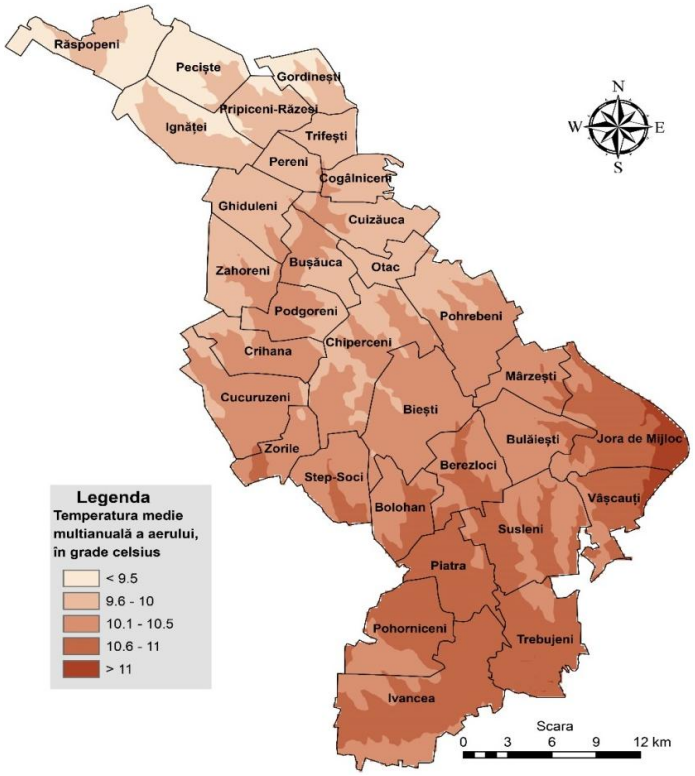


Figure 5. Mean temperature map

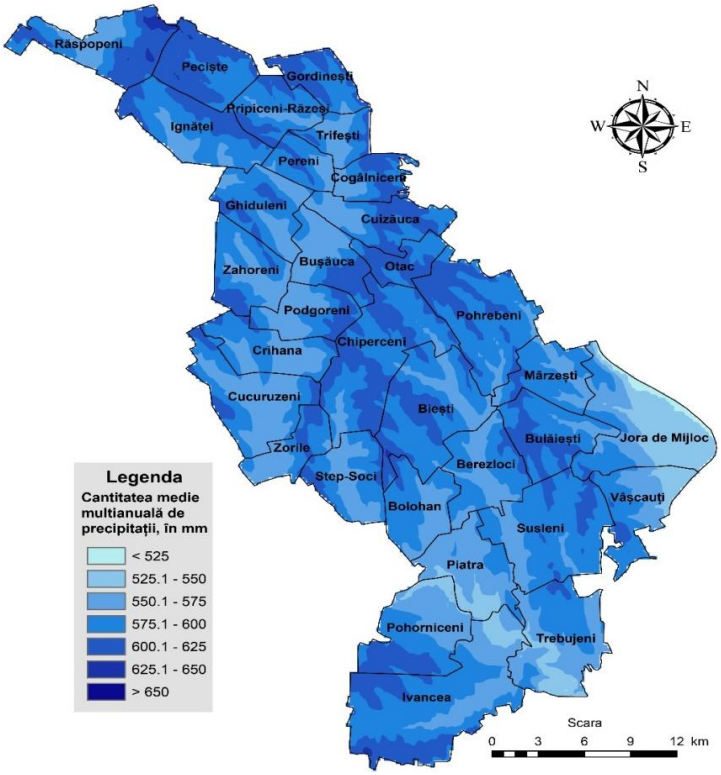


Figure 6. Precipitation map

The mean annual temperatures depend on latitude and altitude. The lowest values are recorded in the northern part (+9.1°C) and on watershed divides, while the highest values are observed in the south-eastern part of the area and in river valleys (+11.1°C) (Fig. 5). In winter, average daily temperatures can drop to -3.9°C, while in summer they reach +21.0°C.

The average annual precipitation is 584 mm and decreases from the north-west towards the south-east (522 mm), with maximum values recorded at elevations above 300 m (over 620 mm) in the central part of the area and minimum values in river floodplains (below 530 mm) in the southern part (Fig. 6).

3. Surface waters (water resources and hydrological regime)

The pilot area, located between the Dniester River and the Cogâlnic and Răut rivers, covers an important interfluve, where the territory is influenced by the hydrographic network of both basins (Fig. 7). In this region, the Dniester is the main watercourse, with a stable flow and significant importance for drinking water supply and irrigation. The Cogâlnic and Răut rivers have lower discharges and a variable hydrological regime, strongly influenced by seasonal precipitation and drought periods, typical for the silvosteppe climate. This variability affects the availability of water resources, especially for agricultural activities in the area.

For the pilot area, it is essential to closely monitor the hydrological regime of these rivers and the interfluve, taking into account the impact of seasonal variability and climate change on water resources. These conditions require adaptation measures for efficient water use, soil conservation, and protection against erosion and flooding.

Figure 7. Hydrographic network

4. Soils

According to the cartographic materials developed by the Institute of Pedology, Agrochemistry and Soil Protection (IPAPS) "N. Dimo," *the following soil subtypes* are distributed within the pilot area: typical chernozems (20.6%); carbonate chernozems (19.7%); grey soils (19.3%); leached chernozems (18.6%); argic (clay-illuvial) chernozems (8.4%); and other subtypes (13.4%) (Fig. 8).

According to the same source, in terms of soil texture, loamy-clayey soils predominate (54.5%), followed by loamy soils (23.8%), and sandy-loamy, clayey, and loamy-sandy soils (21.7%) (Fig. 9). In terms of land use, the pilot area is classified as agro-forestry, with a predominantly forested structure along its central axis and in the southern part, transitioning into a predominantly arable structure towards the west.

Agricultural land accounts for 67.1%, forests for 17.4%, and pastures and settlements each for 7.2%. Water bodies account for only 1.1% of the territory (Fig. 10).

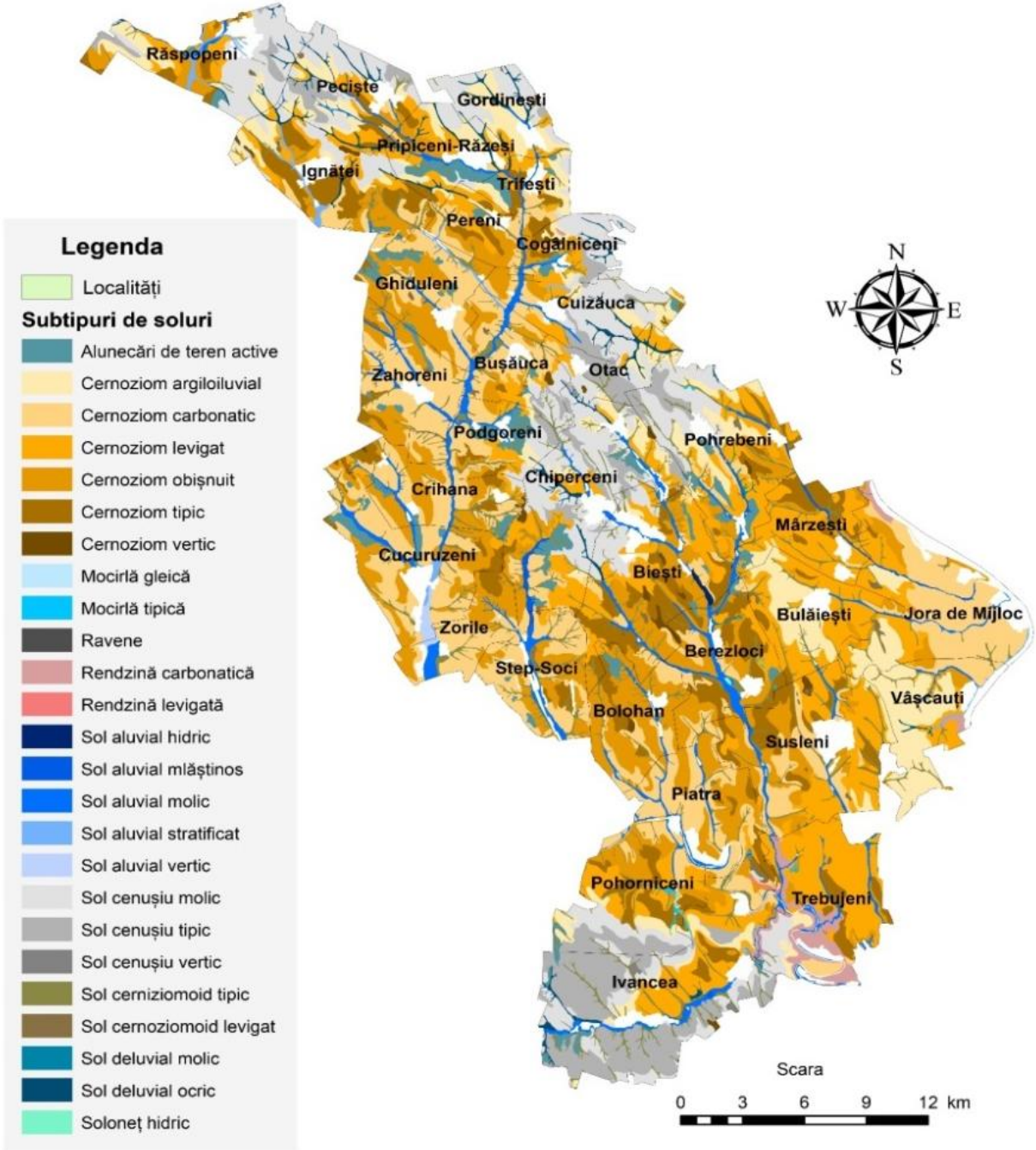


Figure 8. Map of soil subtypes

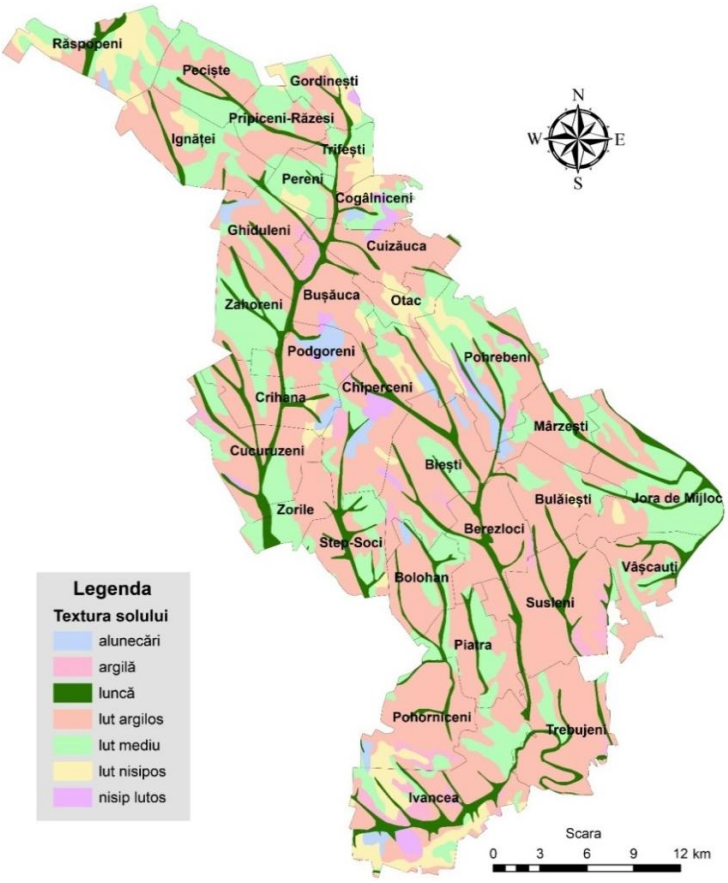


Figure 9. Soil texture map

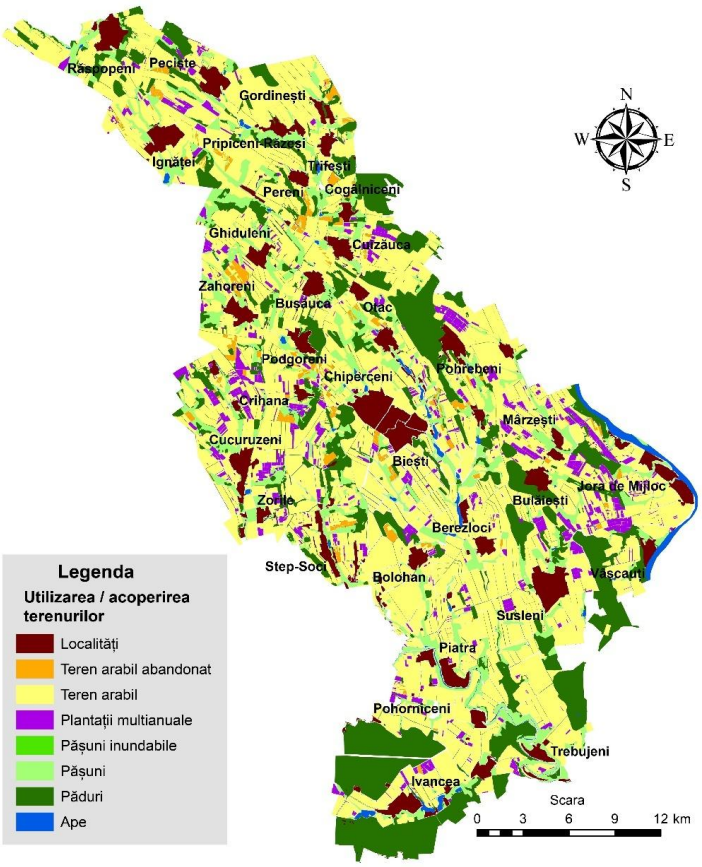


Figure 10. Land use / land cover map

5. Population

According to data from the National Bureau of Statistics (NBS) of the Republic of Moldova, as of 01.01.2024, the population with usual residence in the pilot area amounts to 39.8 thousand inhabitants, representing 1.64% of the total population of the Republic of Moldova.

The area represents a typical rural region (there are no urban settlements).

The average population density within the pilot area is 43 inhabitants/km² (Fig. 11). Over the past 20 years, the total population in this area has decreased by approximately 13,000 inhabitants (or about 25%).

In terms of population size, very small settlements predominate: 15 out of the 32 communes have fewer than 1,000 inhabitants, while the average size of a commune is 1,244 inhabitants. The largest commune (Ivancea, Orhei district) has 3,761 inhabitants, while the smallest (Otac, Rezina district) has only 348 inhabitants.

The demographic structure reflects national trends. Understanding the population structure by age and gender is crucial for assessing the active population and human resource potential, which underpin economic and social planning, as well as the requirements for the sustainable use of natural resources. The gender structure (according to NBS data) shows a ratio of 48.6% male population to 51.4% female population. The young population (0–14 years) accounts for 17.7%, the working-age population for 65.8%, and the elderly population for 16.5%. Employment is predominantly agricultural, accounting for over 80% in the pilot area.

The demographic decline and changes in the demographic structure of the pilot area confirm a modest human potential compared to national average values.

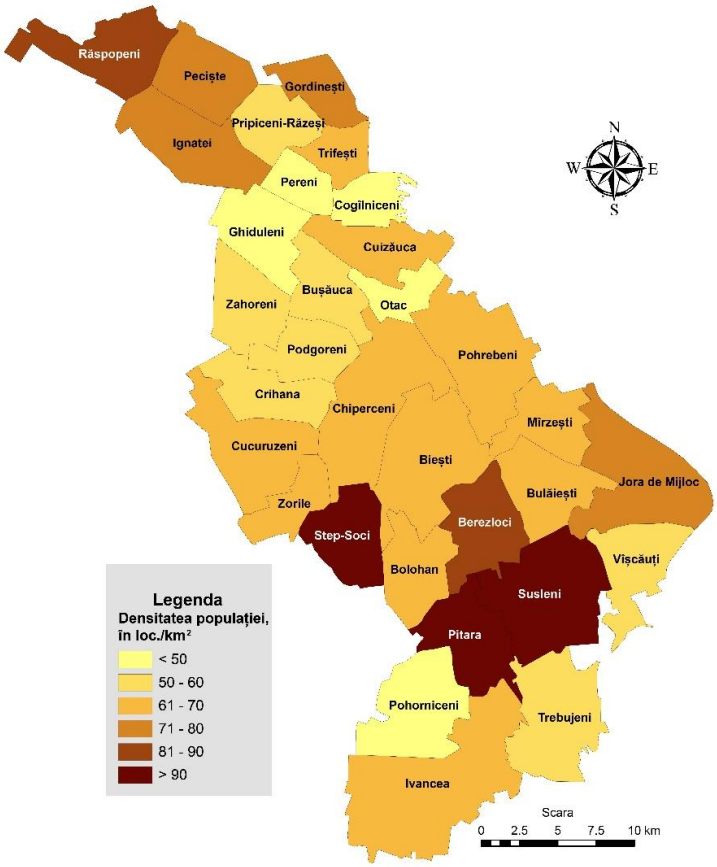


Figure 11. Population density

6. Agriculture

It is a traditional economic sector. The agricultural sector currently accounts for approximately 10% of the total GDP and employs about 20.8% of the active population. At present, agricultural products account for 44.7% of total merchandise exports. The main exported products include cereals, sunflower seeds, fruits, etc. (Territorial Statistics, 2023).

Within the pilot area, as of 01.01.2024, there were 18,750 peasant (farmer) enterprises registered. Enterprises with land areas between 1 and 5 ha predominate (Fig. 12), representing 79% of the total number. These are relatively evenly distributed across the territory (Fig. 13), being more numerous in the central and southern parts.

Agricultural holdings with areas of less than 1 ha account for 14.2% and are predominant in the communes of Ignăței (91.6%) and Bieşti (50.0%), and are also numerous in other communes (Susleni, Pohrebeni, Trifeşti, etc.). The size of agricultural holdings directly influences the processes of mechanization and chemical inputs, the cost of irrigation, and the feasibility of land improvement works and crop rotation systems.

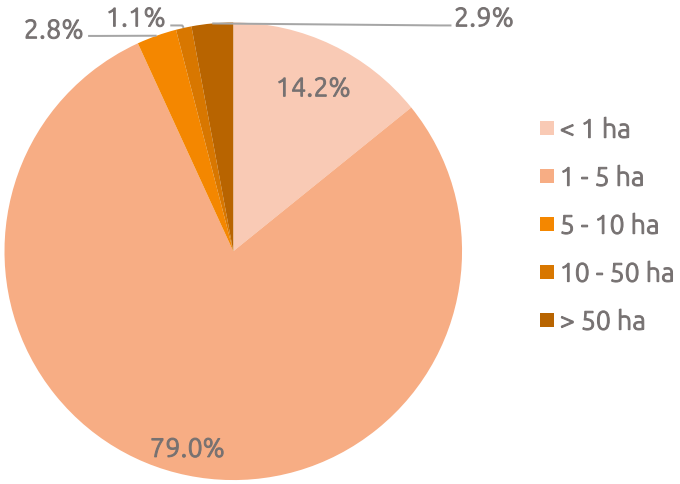


Figure 12. Categories of agricultural holdings by area

Source: based on the Land Cadastre as of 01.01.2025

7. Crop production

The relatively favorable natural conditions in the pilot area allow for the cultivation of a wide range of crops.

Cereal crops are evenly distributed across the territory. Wheat and maize predominate in the structure of cereal crops. In terms of share, areas cultivated with wheat increase from north to south, while those cultivated with maize show the opposite trend, decreasing in the same direction.

The second most important crop (after wheat) is sunflower. Its share remains relatively constant,

with no significant spatial variations, due to the ecological plasticity of the cultivated varieties.

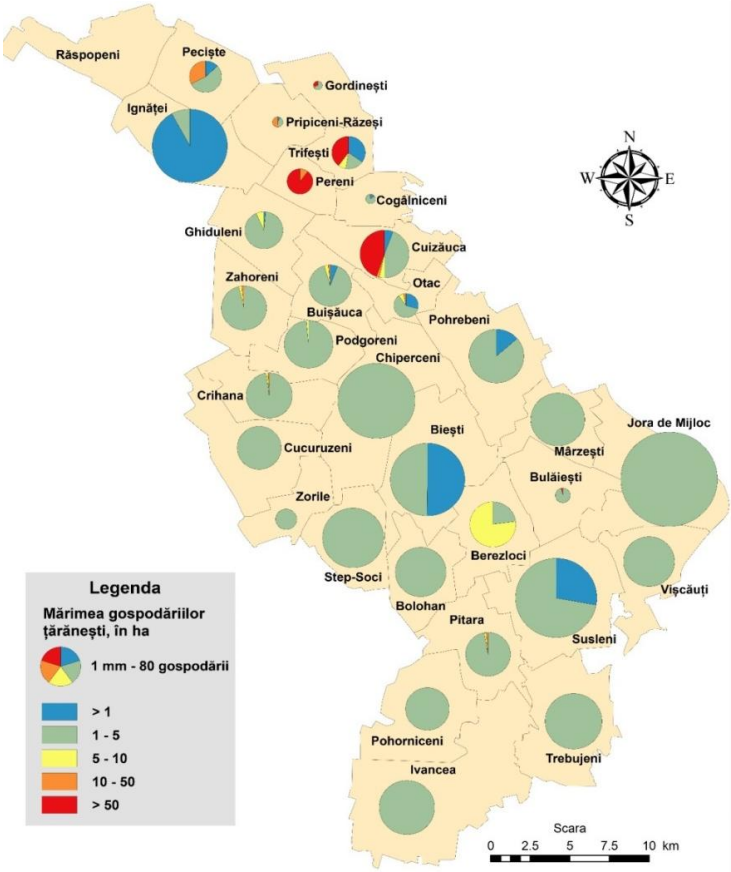


Figure 13. Number and size of agricultural holdings by communes

Source: based on the Land Cadastre as of 01.01.2025

8. Livestock production

Livestock production has been influenced by economic factors (lack of subsidies) and natural factors (recent droughts). Within the pilot area, the total livestock population as of 01.01.2025 amounted to 16,974 heads (1.7% of the national total).

In the structure of the livestock population (Fig. 14), pigs rank first with 5,332 heads, followed by goats with 4,756 heads, sheep with 4,708 heads, and cattle with 2,178 heads. Thus, while the pig population does not vary significantly across communes due to its predominantly intensive nature, the numbers of sheep and goats increase in communes with larger pasture areas, whereas cattle numbers are generally in decline (due to low profitability).

In spatial terms, an increase in livestock numbers is observed in the central part of the area (where extensive pasture areas are available), while a decrease is noted towards the south and north (where pasture areas are more limited) (Fig. 15). In the same area, there is a decline in cattle and pig populations

and an expansion of sheep and goat populations.

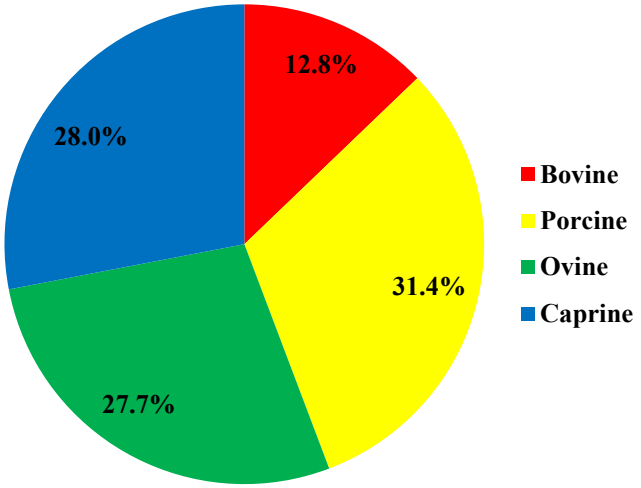


Figure 14. Structure of the livestock population in the pilot area

Source: based on current statistics as of 01.01.2025

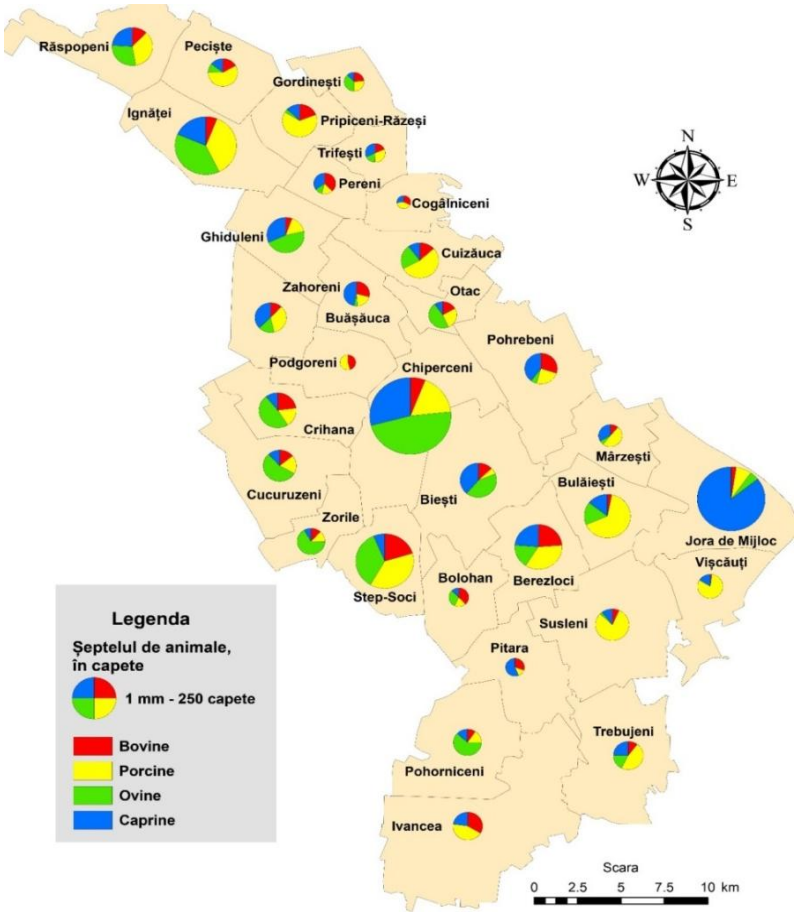


Figure 15. Number and structure of the livestock population

Source: based on current statistics as of 01.01.2025

9. Areas with degradation risk

Currently, approximately 55% of the country's total area is subject to the risk of erosion.

The annual loss of fertile soil from agricultural lands caused by erosion is estimated at 26 million

tons, including 700 thousand tons of humus, 50 thousand tons of nitrogen, 34 thousand tons of phosphorus, and 597 thousand tons of potassium.

The most intensely eroded soils are those with light texture (sandy-loam and loamy-sand), located on sloping arable lands under row crops.

As a rule, the erosion process is irreversible; the more eroded the land is, the lower its resistance to erosion becomes.

According to official data, the total area of degraded lands in the study area is 38,840 ha (40.4% of the total area), including:

- strongly eroded – 4,007 ha (4.2%),
- moderately eroded – 10,897 ha (11.3%), and
- slightly eroded – 23,936 ha (24.9%) (fig. 16 and 17).

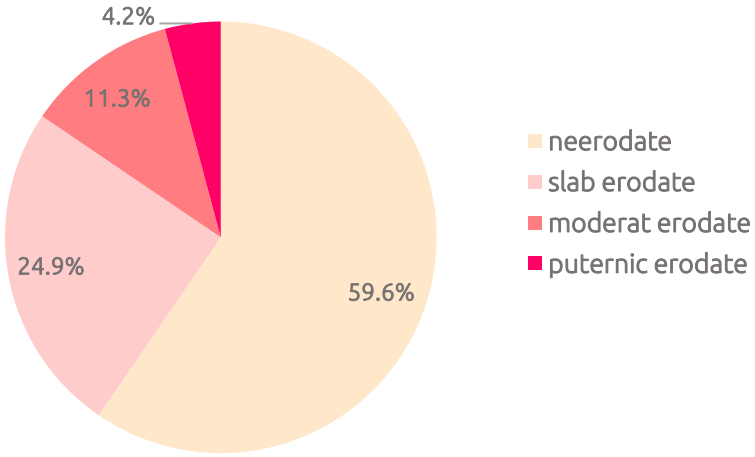


Figure 16. Structure of land by degree of erosion

Source: Land Cadastre, 2025

At the commune level, the most affected areas are those located along the Gordinești–Bolohan axis, most of them within the Cogâlnic River basin. All of these communes have a share of eroded lands exceeding 50%, compared to the national average of 31.6%.

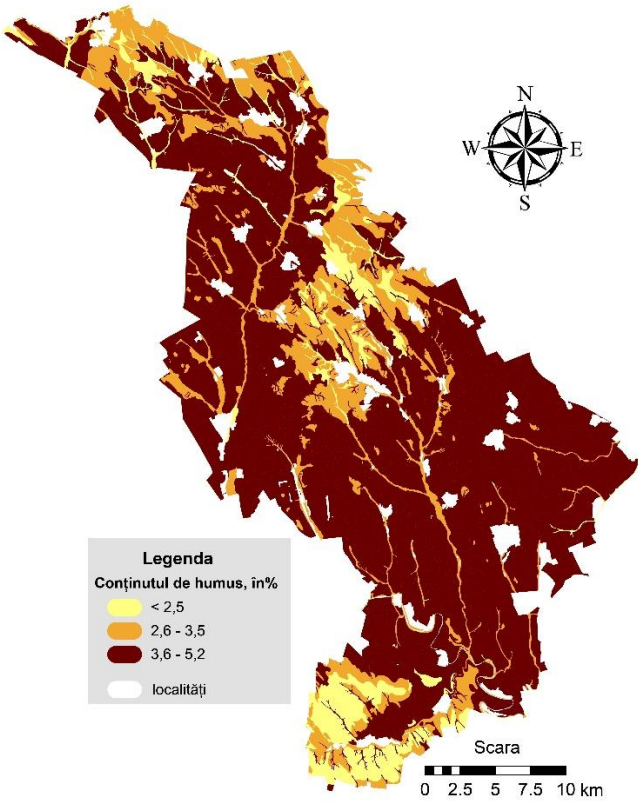
The highest values are recorded in the communes of Ghiduleni (64.6%), Pereni (62.7%), and Bușăuca (60.1%).

In 11 communes, the share of eroded land exceeds 50% of their area; in 9 communes, it ranges between 40% and 50%, while in 8 communes it is between 30% and 40%.

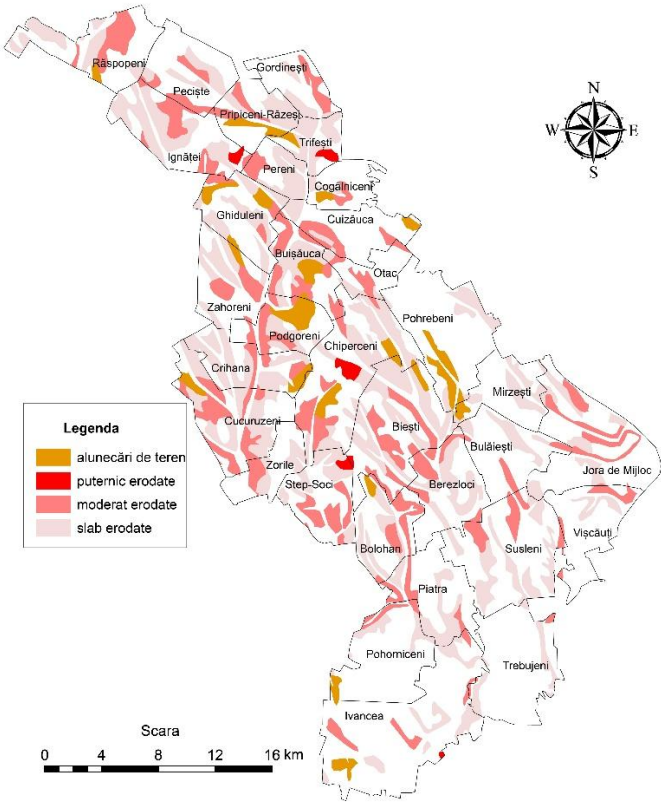
In most cases, agricultural lands in these communes are located on slopes with an inclination exceeding 10°, and the soils at the base are of clay-loam texture.

The lowest values are recorded in the southern part of the area, in the communes of Vâșcăuți (12.5%) and Pohorniceni (fig. 18).

In general, communes located predominantly in river floodplains or with a high degree of forest cover have a lower share of eroded lands.

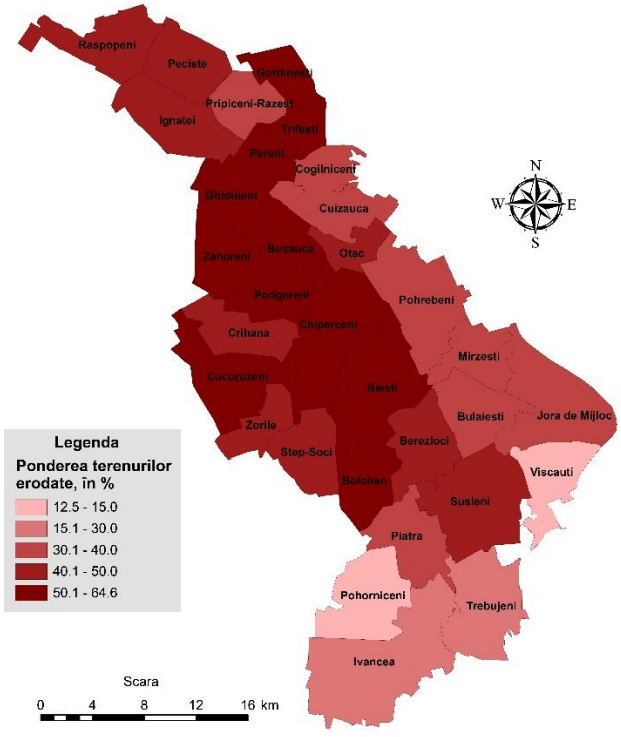


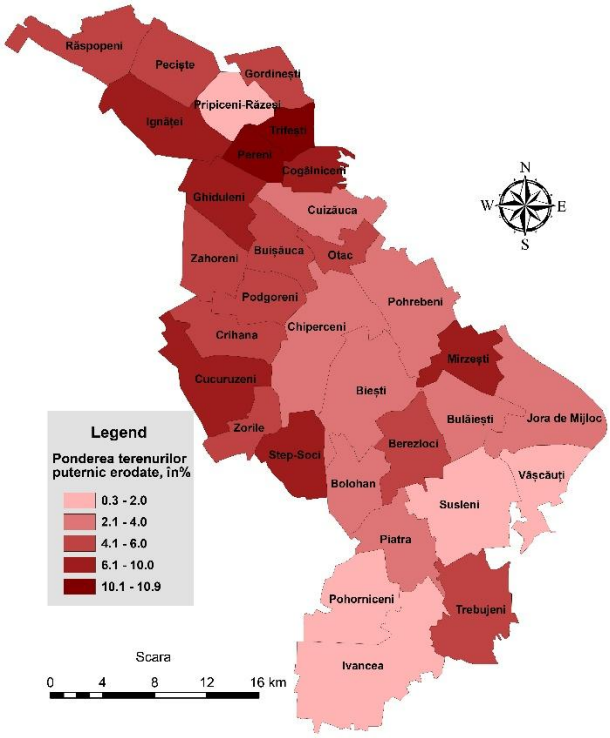
Source: IPAPS „N. Dimo", FAO project



Source: Soils map, scara 1 : 200 000, IPAPS „N. Dimo"

Figure 17. Map of soil erosion





Sursa: Land Cadastre, 2025

Figure 18. Proportion of eroded lands

SECTION 2. AGRICULTURAL LAND PRODUCTIVITY POTENTIAL

10. Suitability of agricultural crops

In the context of achieving Land Degradation Neutrality, crop suitability involves identifying environmental factors and conditions that either favor or limit the cultivation of certain crops. The methodology and the degree of suitability for the main crops are presented in detail in Annex 2.

Among agricultural crops, the highest suitability is observed for vineyards. This is primarily due to their low requirements regarding soil quality, as well as the high proportion of sunny slopes in the region. At the commune level, the best conditions are recorded in Pohorniceni, Podgoreni, Cucuruzeni, and Zorile, where more than half of the agricultural land has very high suitability.

The next most suitable crop is apricot, which has agroclimatic requirements similar to those of the vine. Almost all communes record more than 90% of favorable suitability.

Among other fruit crops, only almond and cherry show values below 80% of favorable suitability, while the remaining crops record values between 80% and 90%.

Among field crops, barley shows the highest suitability, being the most recommended crop in regional crop rotations (including for increasing soil organic carbon), with 89% favorable suitability. In 22 out of 32 communes, favorable suitability exceeds 90%, and in 3 communes (Peciște, Zorile, and Zahoreni) it reaches 100% of agricultural land.

Winter wheat shows only 16% favorable suitability, being suitable only for the communes of Ignăței, Peciște, Răspopeni, Ghiduleni, Pripiceni-Răzeși, and Zahoreni.

The lowest suitability values are recorded for row crops. Maize has only 13% favorable suitability (being suitable only for Pohorniceni commune), while sunflower records a value of only 2%.

SECTION 3. CROP ROTATION

11. Crop rotation

It is an agricultural and economic method of land use. It consists of dividing a land area of varying size into a number of plots on which a structure of agricultural crops is distributed in an order determined by agrobiological and technical rules.

12. Crop rotation (crop sequence)

Within conservative (sustainable) agriculture, crop rotation is a key technological element aimed at maintaining a balance between crops. In our case, the main objective is to maintain soil fertility, namely the soil organic carbon content.

Crop rotation should include perennial and annual legumes, as well as perennial grasses (temporary grasslands). Legumes have the ability to live in symbiosis with nitrogen-fixing bacteria of the genus Rhizobium. Thus, leguminous plants (peas, beans, soybeans, chickpeas, lentils, broad beans, alfalfa, clover, etc.) can meet their nitrogen needs through this symbiosis, and after harvesting, a significant amount of nitrogen remains in the soil.

Perennial crops (grasses and legumes) increase soil organic matter (carbon), improve soil structure, and enhance its water retention capacity. In crop rotation, perennial crops (alfalfa, clover, grasses) grown for 2–4 years are followed by 3–4 years of annual crops.

13. Crop rotation structure

The most widespread example of crop rotation, in the absence of livestock farms, is the following (fig. 19)[1]: 1. peas, vetch mixtures; 2. winter wheat + successive crops; 3. soybean; 4. maize for grain; 5. spring or winter barley + successive crops; 6. maize for grain; 7. peas for grain, beans; 8. winter wheat + successive crops.

Figure 19. Example of crop rotation

[1] **Gumovschi A.** Manualul fermierului pentru culturile de câmp. Partea I. și a II, Chișinău, 2021

14. Basic rules of crop rotation

By selecting an optimal crop structure and rotation (fig. 20) with 25% cereal crops, 25% maize, 25% legumes and industrial crops (soybean, peas, beans, sunflower), and 25% forage crops (alfalfa, annual legumes), soil fertility will increase, livestock numbers will grow, and the need for fertilizers and plant protection products will decrease, while production costs will be reduced and product quality will improve.

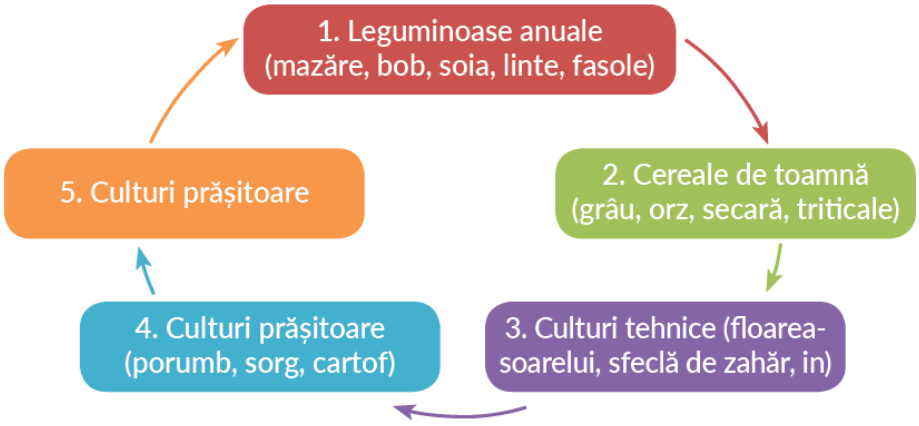


Figure 20.Basic rules of crop rotation

By introducing rational crop rotations, including perennial and annual legumes, production can increase by 35–45% without any additional investments. The following arguments support this:

- Land ploughed in winter should be planted with less demanding crops that can be successfully sown in March, such as oats, spring barley, spring wheat, and peas;
- Sunflower cannot be cultivated after plants affected by white rot, such as soybean, beans, and rapeseed, after tobacco (affected by broomrape), nor after potato, and it can only return to the same field after 6–7 years;
- Soybean is not grown after sunflower and rapeseed for the same reason, nor after other legumes;
- Maize is not grown after sorghum, Sudan grass, or after itself;
- Beetroot is not grown after cruciferous crops, oats, sunflower, nor after itself, and only after 4–6 years.

15. Crop rotation models

For our area, the following crop rotation systems are recommended for arable land:

Crop rotation No. 1

1. Spring vetch-oat mixture (vetch and oats for green mass); 2. Winter wheat; 3. Sugar beet (1); 4. Maize for grain (1); 5. Peas; 6. Winter wheat; 7. Sugar beet (2); 8. Maize for grain (2); 9. Winter barley / spring barley; 10. Sunflower.

Crop rotation No. 2

1. Perennial grasses (1); 2. Perennial grasses (2); 3. Winter wheat, winter barley (1); 4. Sugar beet; 5. Maize for grain (1); 6. Peas for grain; 7. Winter wheat (2); 8. Sugar beet (2); 9. Maize for grain (2); 10. Spring barley.

Crop rotation No. 3

1. Maize for green mass + alfalfa; 2. Alfalfa (vetch-oat mixture for green mass); 3. Alfalfa (2); 4. Winter wheat (1); 5. Sugar beet (1); 6. Maize for grain; 7. Peas for grain; 8. Winter wheat (2); 9. Sugar beet (2); 10. Maize for silage.

Crop rotation No. 4

1. Spring vetch-oat mixture; 2. Winter wheat; 3. Winter rapeseed; 4. Maize for grain (1); 5. Soybean; 6. Winter barley; 7. Sunflower; 8. Maize for grain (2).

Crop rotation No. 5

1. Spring vetch-oat mixture; 2. Winter wheat (1); 3. Sugar beet; 4. Maize for grain; 5. Peas for grain; 6. Winter wheat (2); 7. Sunflower.

SECTION 4. LEGAL AND INSTITUTIONAL FRAMEWORK FOR THE ENVIRONMENT

1. Legal Framework

By signing the Association Agreement between the Republic of Moldova and the European Union, the country committed to transpose into national legislation the provisions of EU directives and regulations included in the "Environment" and "Climate Policy" chapters, and to ensure their implementation. To date, significant progress has been made in fulfilling these commitments, particularly through the adoption and enforcement of horizontal environmental legislation, which includes regulations on environmental impact assessment and strategic environmental assessment, public access to environmental information, and public participation in environmental decision-making.

Regarding sector-specific environmental legislation, there has been tangible progress in transposing EU acts into national law concerning integrated water management, waste management, chemicals, ambient air quality, nature protection and biodiversity conservation, management of genetically modified organisms, and industrial emissions, among others.

For some of these areas, secondary legislation for implementation has been developed, while for others—such as waste management and chemicals—the process of drafting and adoption is still ongoing. At the same time, some legal acts adopted prior to the Association Agreement contain gaps, inconsistencies, ambiguities, disproportional provisions, and even conflicts of norms, which may hinder their clear, coherent, and uniform application. Therefore, urgent measures are required to harmonize and adjust the existing framework.

Furthermore, the dynamic development and evolution of EU legislation, as well as the new EU–Moldova Association Agenda for 2021–2027, require the continuous improvement of the environmental regulatory framework and its alignment with new EU legal developments. In addition, strengthening efforts to ensure the full implementation and enforcement of the environmental legal framework by all relevant stakeholders is essential.

2. Institutional Framework

The quality of public administration in the field of environmental protection has a significant impact on the results of environmental policy implementation, on the quality of public services provided in this area, aspects that are correlated with the level of public trust in public administration, with a favorable business climate, and with the overall level of societal well-being. The main stakeholders in the study area, with reference to land degradation issues, are:

Ministry of Environment – the central specialized authority of public administration responsible for developing and implementing government policy in the fields of environmental protection, climate change, and sustainable management of natural resources.

Environmental Protection Inspectorate (Orhei, Rezina, and Șoldănești Territorial Environmental Inspectorates) – responsible for controlling activities affecting soil resources, ensuring compliance with legal and regulatory provisions, and applying administrative sanctions.

State Hydrometeorological Service (SHS) – (which will be reorganized in 2026 into the Meteorology and Environmental Monitoring Authority, taking over all monitoring functions from other institutions) – responsible for hydrometeorological and agrometeorological observations, weather and hydrological forecasting, and issuing warnings on hazardous hydrometeorological phenomena. SHS is the national focal point of the UNCCD Convention and is directly responsible for implementing state policy in this field. Within the institution, the Working Group for UNCCD implementation and the Working Group for achieving Land Degradation Neutrality (LDN) targets have been established, bringing together experts from relevant institutions, including academia and civil society.

Moldsilva Agency (State Forestry Enterprises of Șoldănești and Orhei) – responsible for implementing forestry policy, ensuring forest protection and guarding activities. Its soil protection function is ensured through the management of shelterbelts and afforestation of degraded lands.

Environmental Agency – currently, environmental quality monitoring is carried out by its Environmental Reference Laboratory, based on annually approved monitoring programs. (These functions will be transferred to the newly created Meteorology and Environmental Monitoring Authority.) Moldova currently lacks an automated environmental monitoring system; therefore, monitoring is conducted through periodic manual sampling at designated stations, with specified parameters for each environmental component. The Soil Quality Laboratory monitors agricultural lands over an area of 1,986 ha across 10 administrative districts and various crop types.

Agency for Geodesy, Cartography and Cadastre – responsible for monitoring soil resources; in case of violations, it must notify environmental inspectors and request support from the Environmental Agency or research institutions.

Ministry of Agriculture and Food Industry (MAFI) – develops and promotes policies for the development of the agri-food sector, ensures food security, regulates organic production, and manages international technical assistance. It also contributes to increasing climate resilience in land and water resource management and supports rural development.

National Agency for Land Improvement – responsible for implementing state policy in the fields of land reclamation, land improvement, land relations, land cadastre, and land monitoring.

SECTION 5. MONITORING OF ENVIRONMENTAL FACTORS AND HYDROMETEOROLOGICAL CONDITIONS IN THE PILOT AREA

The monitoring system for environmental factors and hydrometeorological conditions in the pilot area is underdeveloped. According to a study conducted in 2021–2022 with the support of the United Nations Development Programme under the National Climate Change Adaptation Planning Project, the Dniester Silvosteppe Plateau is classified as one of the three "grey zones," meaning areas not covered by hydrometeorological or environmental monitoring stations (fig. 21). In the pilot area, there are three meteorological stations (Șoldănești, Brăviceni–Orhei, and Rezina), which have limited capacities and provide observations for only four parameters (air/soil surface temperature, precipitation, and relative humidity). These stations cover only a radius of 10 km around their locations and are not representative of the entire area.

The nearest meteorological stations that operate with the full range of observational parameters are located at a distance of approximately 50 km (Bălți municipality to the northwest, Bravicea village to the southwest, and Rîbnița town to the northeast). Surface water and agrometeorological conditions are also not represented in the area by dedicated monitoring stations or observation posts. Hydrological monitoring is represented by two hydrological observation stations: the first is located in the northern part of the area, in Mateuți village, on the Ciorna River, which flows into the Dniester River in Rezina town; the second is located on the Răut River, a tributary of the Dniester, approximately 5 km southeast of Orhei, in Jeloboc village.

Another analysis of the density of the hydrometeorological and environmental monitoring network, conducted within the framework of the State Hydrometeorological Service with the support of Meteo France International in the year 2023[2], shows that the Dniester Silvosteppe Plateau lacks observational coverage and is the most vulnerable physical-geographical area in terms of environmental factor assessment. A single air quality monitoring station has recently been installed in Mateuți village, located in the northeastern extremity of the pilot area. The station is not yet fully operational and is not included in the environmental information system.

The monitoring system for environmental factors and hydrometeorological conditions in the pilot area requires modernization, involving significant investments. By analyzing the horizontal and vertical distribution of stations to determine their representativeness and spatial coverage based on a 20 km radius, as well as coverage across all altitudinal belts, it has been assessed that the hydrometeorological monitoring network, including areas around pilot localities, can be expanded by adding 5 meteorological stations (including 2 with an agrometeorological program) and 4 additional hydrological stations to fill existing gaps in the network. Particular attention should be given to ensuring coverage of environmental quality monitoring points (air, water, and soil). The authors of the study recommend the placement of these stations according to Table 2 and Figure 22.

[2] Document de concept – Proiect de modernizare globală a Sistemului de monitoring hidrometeorologic și al factorilor de mediu, Chișinău, 2023

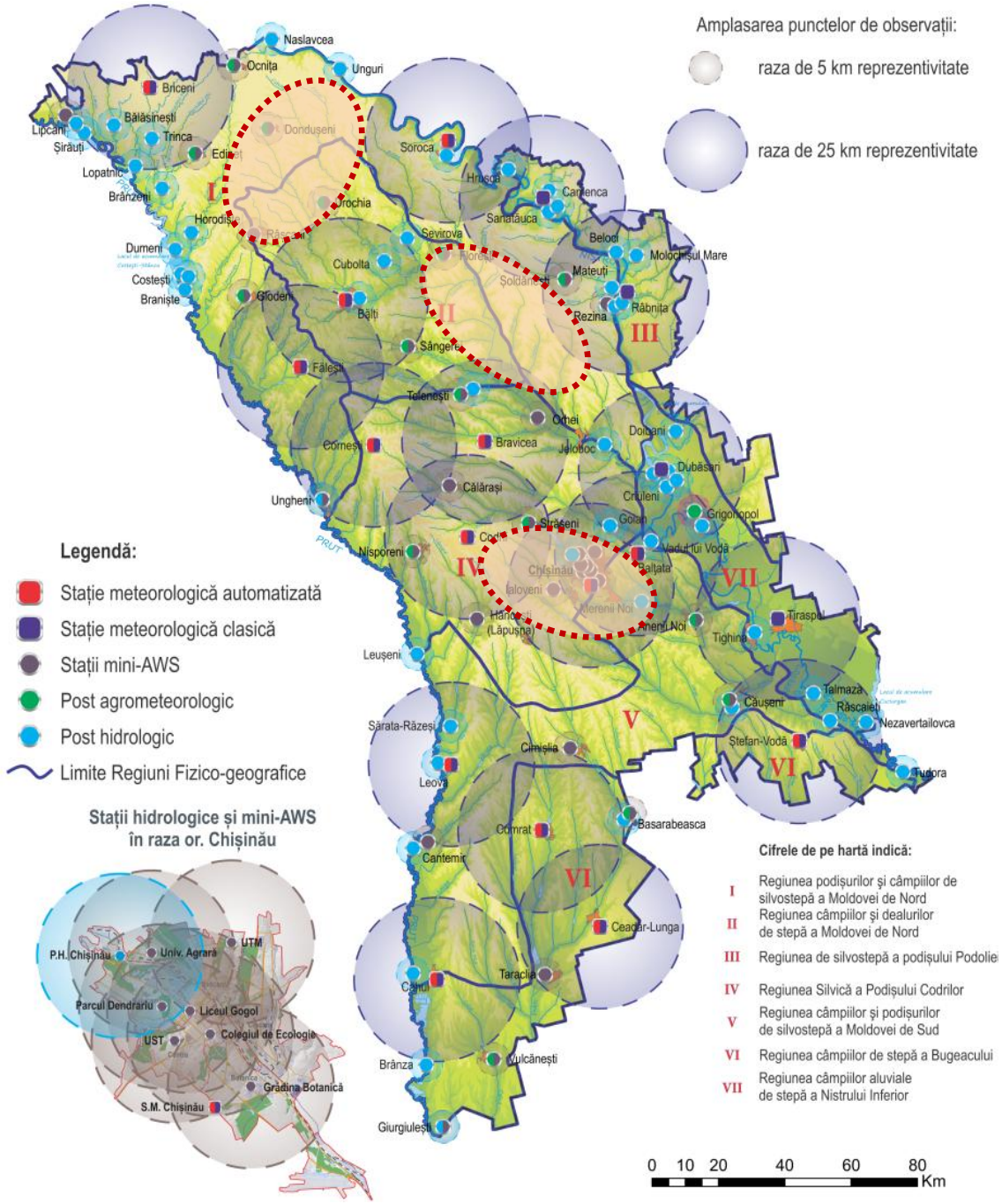


Figure 21. Hydrometeorological monitoring network of the State Hydrometeorological Service (SHS)

Table 2. Locations of environmental and hydrometeorological monitoring stations in the pilot area

N/o	Locality name	Hydrological basin/sub-basin	Coordonate geografice	Altitude (m)	Monitoring type
1	Cernița, r-ul Florești		47° 57' 53.39" lat. N 28° 28' 3.4" long. E	209,9	Meteorological
2	Lucășeuca, r-ul Orhei		47° 20' 18.01" lat. N 28° 46' 31.28" long. E	82,3	Meteorological
3	Pohrebeni,		47° 33' 20.57" lat. N	274,1	Meteorological

	r-ul Orhei		28° 54' 2.25" long. E		
4	Orhei, (bridge entrance)		47° 21' 15.24" lat. N 28° 48' 36.5" long. E	40,4	Air quality (road traffic)
5	Orhei (exit to the ring road)		47° 23' 28.1" lat. N 28° 47' 57.87" long. E	38,6	Agrometeorological Soil quality
6	Mateuți, r-ul Rezina		47° 47' 17.06" lat. N 28° 57' 29.42" long. E	46,6	Agrometeorological Soil quality
7	Soloneț, r-ul Florești,	r. Soloneț	47° 48' 48.6" lat. N 28° 24' 7.88" long. E	67,9	Hydrological regime
8	Ratuș, r-ul Telenești	r. Ciulucul Mare	47° 31' 34.43" lat. N 28° 30' 16.74" long. E	40,1	Hydrological regime
9	Cișme, r-ul Orhei	r. Cogâlnic	47° 28' 11.33" lat. N 28° 43' 29.56" long. E	44,1	Hydrological regime
10	Morozeni, r-ul Orhei	r. Cula	47° 23' 50.53" lat. N 28° 23' 41.64" long. E	33,9	Hydrological regime Rainwater quality

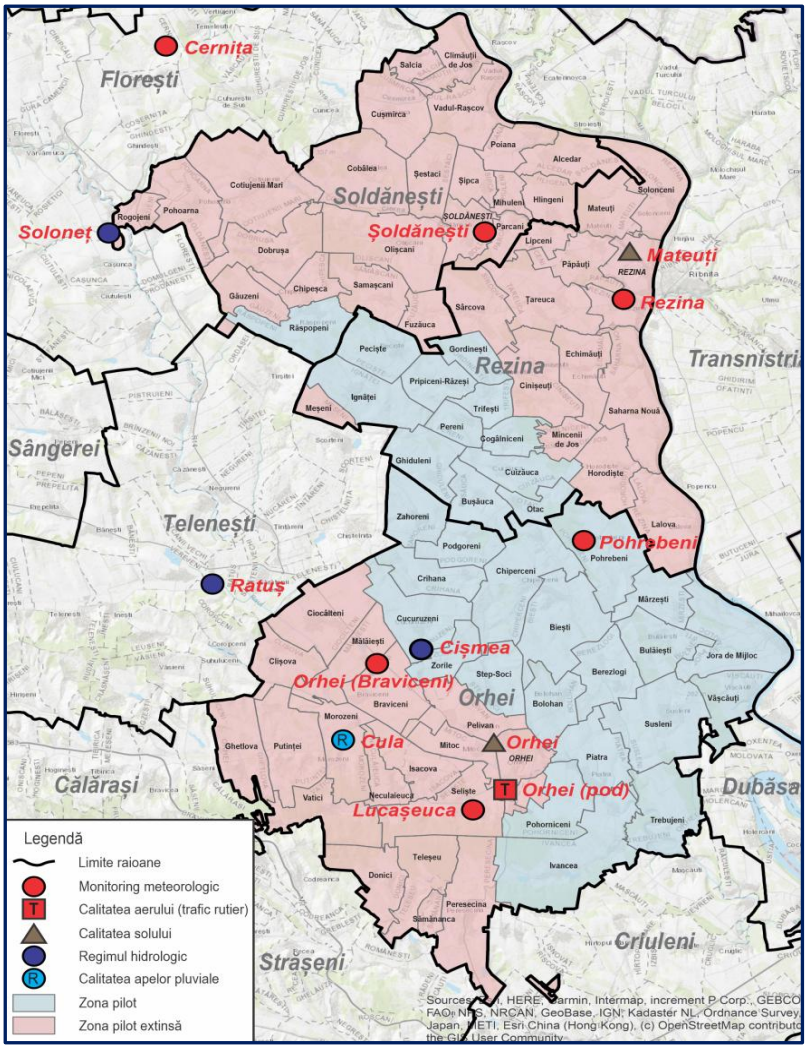


Figure 22. Proposed environmental and hydrometeorological monitoring network in the pilot area

An alternative solution to ensure the availability of observational data for the settlements in the pilot area is the establishment of a private monitoring network. This opportunity is regulated by Law No. 368/2023 on meteorological and hydrological activities, which, under Article 10, establishes the rights and responsibilities of central and local authorities, as well as other categories of natural and legal persons, to establish and operate their own observation stations. Owners of agricultural land may carry out meteorological and hydrological activities or certain related works and services aimed at generating specific data and information in the field, in accordance with methodological requirements, provided that they are registered in the prescribed manner. Examples of best practices in the rational management of land through the monitoring and use of agrometeorological data or environmental quality information can be presented and disseminated by farmers' associations and landowners in different regions of the country.

Currently, in accordance with the Environmental Strategy for the period 2024–2030, approved by Government Decision No. 409/2024, the Ministry of Environment has launched a comprehensive process supported by enhanced measures aimed at developing the system for monitoring environmental factors and hydrometeorological conditions, as well as strengthening the capacities of public and private institutions in the production and management of environmental data, integrating science, technologies, and field-based data. As result indicators for each area of intervention, actions are planned within subsequent departmental and governmental regulatory frameworks, including procedures for monitoring, recording, reporting, and managing environmental data, as well as the development of guidelines, methodologies, and instructions).

The methodological guidelines on environmental factor monitoring, as well as on meteorological, agrometeorological, and hydrological monitoring, are currently under development and promotion. At the finalization stage is the Methodology for drought risk assessment, linked to the Regulation on drought, approved by Government Decision No. 779/2013 and updated in 2023, which aims to monitor the state and evolution of hydrometeorological conditions for drought protection purposes. The objective of this action is to develop a functional tool for the activity of authorities and institutions with competencies in the field, and to enhance resilience to this extreme climatic phenomenon.

The State Hydrometeorological Service is at the finalization stage of an informational portal for the monitoring and assessment of drought risk, supported by an interactive map displaying the drought index at both the general territorial level and for each locality in particular. The portal is planned to be launched on the institution's website starting in 2025.

Currently, the "Methodology for the Organization of Soil Quality Monitoring in the Republic of Moldova" is under development"[3], that stipulates that that soil quality monitoring will be carried out by the Agency for Geodesy, Cartography and Cadastre, with the support of the Public Institution "N. Dimo Institute of Soil Science, Agrochemistry and Soil Protection" (currently also undergoing absorption and reorganization), as well as other relevant entities and research and innovation organizations in the field.

With the reorganization of the institutions subordinated to the Ministry of Environment, the Meteorological and Environmental Monitoring Authority will need to strengthen its monitoring capacities through closer cooperation with the Agency for Geodesy, Cartography and Cadastre, with the support of researchers from the former Institute of Soil Science (reorganized into the Department of Pedology and Agrochemistry within the National Institute for Applied Research in Agriculture and Veterinary Medicine).

The recommended structure of the newly established Agency will include the monitoring of environmental factors; coordination of data collection and their integration into information systems

[3] https://maia.gov.md/ro/content/metodologia-privind-organizarea-monitoringului-calit%C4%83%C8%9Bii-solului-republicii-moldova

by other institutions in the environmental sector; reporting on the state of environmental factors; data analysis and public communication on environmental conditions; education and awareness-raising in line with environmental policies, issues, and existing risks; as well as the maintenance of resources and information systems in the field of environment.

SECTION 6. ENVIRONMENTAL INFORMATION, AWARENESS, AND EDUCATION OF THE POPULATION

The effectiveness of environmental policies is based on data, indicators, information, and assessments related to the implementation of environmental legislation, as well as on results of scientific research in the field. However, for proper information dissemination, it is necessary to optimize and redesign the flow of published environmental information so that it is easily accessible and user-friendly, as well as to continuously improve both the quantity and quality of information published on the official websites of the authorities. In addition, activities aimed at raising awareness about existing regulations and the institutions involved in ensuring this process remain insufficient.

The use of digital opportunities can enhance public access to information regarding the current state of land in the pilot area, thereby encouraging behavioral changes within the population. Additional efforts in these areas would bring benefits to citizens, businesses, and public institutions.

Promoting and understanding the need to combat desertification and achieve land degradation neutrality are priorities for the Republic of Moldova. At the central level, various tools will be planned to increase awareness of desertification, including environmental authorities' websites, information campaigns, training activities on relevant regulations, communication platforms, etc.

Achieving land degradation neutrality must be based on modern studies of erosion processes. In recent years, a deterioration of the situation has been observed in the country, caused by reduced funding and the ongoing restructuring of research institutes, as well as a shortage of human resources in the field. This is further compounded by the lack of an adequate soil quality monitoring system. A current solution would be the monitoring of soil erosion levels based on orthophoto imagery, which is available across the entire territory of the country.

A priority for the coming years should be awareness-raising and environmental education activities for farmers regarding the benefits of achieving land degradation neutrality. In this context, there is a need to improve both the quantity and quality of information disseminated to them, as well as to organize periodic awareness-raising activities and workshops. It is essential to fully leverage available digital opportunities to better inform farmers about the current state of land resources at the local level, thereby encouraging behavioral change.

The strategy aims to address this critical issue through a holistic and gender-sensitive approach, integrating the interconnected elements of land management, including political, institutional, agricultural, technical, and community factors, with the ambitious goal of contributing to the achievement of land degradation neutrality in the area.

It will transition from national policies and frameworks to implementation at the local level, while ensuring the effective adaptation of land degradation neutrality principles to the local context. Specifically, the strategy aims to strengthen the enabling environment in the pilot area to support the widespread adoption of sustainable land management practices, providing opportunities for key institutions, stakeholders, and decision-makers to adjust land degradation neutrality-related measures to better suit the local context, while also improving intersectoral coordination and the capacity to support promoted initiatives.

The strategy will facilitate a participatory approach at the local level to promote the development of land-use plans, with the active involvement of key local stakeholders, including local public

authorities, civil society, scientific entities, and the private sector, ensuring that interventions reflect and respond to local needs, while taking into account environmental, landscape, climatic, cultural, and socio-economic factors. Practical demonstrations will be carried out through farmers' field schools to promote sustainable land management practices.

In addition, the strategy will enhance the knowledge of farmers and landowners regarding the potential benefits of sustainable land management processes, while also educating the general public about the extent and negative impacts of land degradation. This initiative will include workshops, awareness campaigns, and the development of educational materials to effectively reach diverse audiences at the national level.

Increasing awareness and understanding of land degradation neutrality principles is also considered essential to encourage broad and active participation in decision-making processes, in order to guide and prioritize efforts in an effective manner.

CHAPTER II. SWOT ANALYSIS

SECTION 1. SWOT ANALYSIS (TABLE FORMAT)

The SWOT analysis was also conducted based on the data obtained within the FAO project "Mapping of natural and anthropogenic factors and the development of pedological-agrochemical reports on soil degradation processes in the pilot area".

Table 3. SWOT Analysis

STRENGTHS	*WEAKNESSES*
▪ Relief and climatic conditions are favorable for the development of crop production and livestock farming; ▪ Soils are diverse and relatively productive; ▪ Presence of a large number of smallholder farms; ▪ Favorable conditions for the production of organic products; ▪ Presence of the Dniester River; ▪ Well-developed road transport network (national road R20); ▪ Availability of programs supporting afforestation and reforestation, restoration of degraded land, and carbon sequestration; ▪ Clear strategic vision tailored to the area for environmental protection in line with European standards; ▪ Priority attention to land use regulation and soil/land protection issues; ▪ Medium-term expenditure framework and coherent environmental policy at central level, supported by funding allocations through projects and grants.	▪ Extensive areas of slightly and moderately degraded land; ▪ Large areas of arable land located on slopes; ▪ Very limited state budget funding for land improvement measures; ▪ Underdeveloped monitoring of climatic conditions and environmental quality; ▪ Lack of reliable data on soil, air, and water quality indicators in the region; ▪ Absence of a local early warning system for natural disasters; ▪ Excessive fragmentation of agricultural land; ▪ Low level of development of irrigation systems; ▪ Limited business management skills among local leaders; ▪ Weak institutional coordination at central level, including insufficient coordination of donors and funding; ▪ Lack of incentives for private investors; ▪ Unclear regulatory framework regarding the role of local authorities in land protection; ▪ Inefficient tools for tracking green, clean, or low-carbon investments.
OPPORTUNITIES	*THREATS*
▪ Opportunities for expanding irrigation systems; ▪ Availability of a detailed GIS database (1:10,000 scale); ▪ Models on land productivity potential (Land Productivity Potential); ▪ Development of agricultural clusters; ▪ Availability of significant funding sources; ▪ Existence of agricultural subsidies; ▪ Availability of preferential loans; ▪ Presence of Local Action Groups (LAGs); ▪ Strengthening of investment policies at the local level; ▪ High demand on the European market for organic agricultural products; ▪ Contribution to climate-resilient agriculture and sustainable rural development; ▪ Implementation of robust rural development and agricultural land management policies; ▪ Participatory approach with involvement of individuals and local stakeholders; ▪ Improvement of the investment and business climate.	▪ Climate change; ▪ Droughts; ▪ Intensification of erosion processes; ▪ Lack of financial resources; ▪ Degradation of agricultural land quality; ▪ Lack of coordination and alignment of policies and activities at central level; ▪ Insufficient financial support; ▪ Lack of clearly defined responsibilities of local authorities in addressing land degradation issues; ▪ Unfavorable business and investment climate; ▪ Climate risks are not perceived as a shared social responsibility; ▪ Limited political influence of environmental authorities; ▪ Inadequate information among local private stakeholders; ▪ Fragmented land ownership; ▪ Increasing rural depopulation.

SECTION 2. STRENGTHS

The main strengths of the Strategy are as follows:

1) The region's relief is quite diverse, with altitudes ranging from 20.9 m to 323.6 m. This has led to the presence of plains, interfluves, terraces, and floodplain areas. The varied geomorphological conditions allow for balanced development of the agricultural sector (cereal and industrial crops, fruit growing, vegetable production, and livestock farming).
2) Climatic conditions are more favorable than in neighboring regions. The average annual precipitation amounts to 584 mm, compared to the national average of 546 mm, while the average annual temperature is +9.1°C, compared to the national average of +10.4°C. Thus, the hydrothermal coefficient has higher values (1.2–1.4), allowing optimal moisture supply for agricultural crops.
3) Soil (pedological) conditions are quite favorable and diverse in the pilot area. Chernozems account for about 70% of the region's surface, while the share of strongly eroded land is only 0.5% (compared to the national average of 4.2%). These conditions are beneficial for agricultural crops.
4) There is a large number of smallholder farms – 18,750. Farms with areas between 1 and 5 hectares predominate (79%). The highest number of farms (over 1,000 each) are registered in the communes of Jora de Mijloc, Susleni, Chiperceni, Ignăței, and Bieşti.
5) Climatic conditions and the presence of fertile soils create favorable conditions for producing organic products without the use of chemical fertilizers. Organic barley and maize are produced in Furceni village (Ivancea commune), while in Bolohan commune, organic seeds of cereals and sunflower are produced.
6) The presence of the Dniester River in the eastern part of the region provides opportunities for using water resources for irrigation as well as for supplying the population with drinking water.
7) The road transport network is relatively well developed. The region is crossed from north to south by the national road R20.
8) Accessible programs for afforestation and reforestation, restoration of degraded land, and carbon removal exist under Law No. 1041/2000 on the improvement of degraded land through afforestation, implemented through the National Program for Forest Expansion and Rehabilitation for 2023–2032, approved by Government Decision No. 55/2023.
9) A clear strategic vision tailored to the region for environmental protection in line with European standards is reflected in the Environmental Strategy 2024–2030, the Climate Change Adaptation Programme 2030, the Land Improvement Programme 2021–2025, the National Agricultural and Rural Development Strategy 2023–2030, and the present Strategy. These emphasize the identification of financial resources needed to implement planned actions, including through local action plans.
10) A medium-term expenditure framework and coherent environmental policy at the central level, supported by funding allocations through projects and grants. The new approach to strategic planning—supported by budgetary funding and project/grant allocations—recently implemented within the public administration system at levels I and II, opens new opportunities for sector development.

SECTION 3. WEAKNESSES

The main weaknesses of the Strategy are as follows:

1) Slightly and moderately degraded lands are quite extensive. According to previously obtained cartographic materials, as well as recent statistical data[4], the area of slightly eroded land in the region accounts for 17.8%, while moderately eroded land represents 9.4% of the total area. Statistical data indicate an annual increase rate of degraded land of 0.2%.

[4] Conform Cadastrului funciar, la 01.01.2024, Anexa 4 din https://dataset.gov.md/dataset/cadastrul-funciar-2024

2) Large areas of arable land are located on slopes. Currently, 44,567 ha of arable land (or 93% of their total area) are situated on slopes greater than 2 degrees, while 4,809 ha (10%) are on slopes exceeding 6 degrees. Most of these lands are exposed to erosion processes, mainly due to the lack of protective forest shelterbelts and the widespread cultivation of row crops.
3) Very limited state budget funding for land improvement measures. According to the 2024–2025 Action Plan for the implementation of the Land Improvement Programme aimed at ensuring sustainable soil resource management[5] a total of 22,332 thousand lei is allocated at the national level. Hypothetically, only 625 thousand lei would be allocated to our region for the 2024–2025 period. According to current costs, the planting and maintenance of 1 hectare of forest vegetation amounts to approximately 100,000 lei.
4) Underdeveloped and poorly represented monitoring of climatic conditions and environmental quality. The system for monitoring environmental factors and hydrometeorological conditions in the pilot area needs to be modernized, requiring significant investments.
5) Lack of relevant data on soil, air, and water quality indicators in the region. Local public authorities, large agricultural enterprises, as well as local farmers, do not have access to, and do not apply in land management practices, relevant data and information on environmental factors; the local population is not informed about the state of environmental conditions.
6) Absence of soil quality monitoring points in the region. Currently, there are no pedological or agrometeorological monitoring stations in the region.
7) Excessive fragmentation of agricultural land. The average size of an agricultural holding in the region is 3.43 ha. However, this is divided into several small parcels (2–3 arable plots, 1 vineyard or orchard, etc.), which complicates the process of agricultural mechanization.
8) Low level of development of irrigation systems. According to the „Apele Moldovei"[6], Agency, there is only one water users' association for irrigation in the region — in Jora de Mijloc commune.
9) Limited availability of business management skills among local leaders. At the level of regional and local policies, there are no training or capacity-building programs for developing the business skills of local leaders.
10) Weak institutional coordination by central authorities, including the lack of effective and uniform coordination of donors and funding. There is no unified coordination of assistance projects and programs, nor is there a procedure for attracting or engaging local leaders in such activities.
11) Lack of incentives for private investors. State policy in this regard is still at a developing stage. In recent years, several initiatives have been approved and launched at the central level to attract investments for business activities, with a particular focus on the agricultural sector.
12) Unclear regulatory framework regarding the roles of local authorities in land protection. In 2017, the European Commission published a guide aimed at helping Member States protect agricultural land from threats and restrict the sale of agricultural land in order to preserve farming communities and promote sustainable agriculture. In our country, a sustainable mechanism for implementing this guide in practice has not yet been established. Similarly, there are still no well-defined mechanisms regarding the roles and competencies of local authorities in environmental protection.

SECTION 4. OPPORTUNITIES

The opportunities of the Strategy are as follows:

1) Existence of irrigation possibilities. The eastern border of the region is formed by the Dniester River, which represents an excellent water source for irrigation. Additionally, in the southern part, the region is crossed by the Răut River, which also provides certain opportunities for the use of its waters for irrigation.

[5] https://www.legis.md/cautare/getResults?doc_id=141834&lang=ro
[6] https://www.apelemoldovei.gov.md/pageview.php?l=ro&idc=147

2) The region has a very detailed GIS database (scale 1:10,000), which allows more efficient land management. This source can provide farmers with qualitative and up-to-date data on soil conditions and climatic conditions in the region.
3) The existence of developed models on land productivity potential (Land Productivity Potential Model), containing updated data for 20 agricultural crops. These can be successfully used for crop rotation planning and for adjusting current land use practices.
4) The creation of agricultural clusters (wine-growing, vegetable/fruit-growing) will increase farmers' access to information, new markets, and more productive varieties, while also enhancing environmental awareness.
5) Significant funding sources. Most farmers who operate registered agricultural enterprises have access to funding sources such as the National Rural Development Fund (NRDF), the International Fund for Agricultural Development (IFAD), etc.
6) Existence of agricultural subsidies. The Agency for Intervention and Payments in Agriculture (AIPA) provides farmers with opportunities to develop, become sustainable, and competitive by accessing subsidies and support programs for the private sector in rural areas.
7) Availability of agricultural loans with preferential interest rates and conditions. Most banks offer low-interest loans to agricultural producers. Preferential loans are also available for certain sectors (e.g., fruit growing, viticulture), where part of the loan is provided in the form of a grant.
8) The existence of Local Action Groups (LAGs) provides opportunities for project implementation. LAGs are partnerships established in rural territories, bringing together representatives from the public, private, and civil society sectors. Within the region, the LAG "Baștina Gospodarului" operates, covering 23 communes in Orhei district, and the LAG "Trei Coline", covering 12 communes in Rezina and Șoldănești districts.
9) Improving local investment policies involves creating an attractive local investment climate by implementing the provisions of the National Regional Development Strategy.
10) High demand on the European market for organic agricultural products. The European organic products market is the most dynamic, with an average annual growth of approximately 10%. Proximity to European Union countries provides an opportunity to fully benefit from this advantage.
11) Contribution to climate-resilient agriculture and sustainable rural development. Although many innovations could significantly improve the resilience of agricultural systems in the Republic of Moldova, the lack of financial resources at the local level represents a serious barrier to their implementation. Only major investments from the state and external development partners can restore infrastructure and adapt policies that support and enhance adaptation options, strengthening the resilience of the agricultural sector and sustainable development in the future.
12) Implementation of strong rural development and agricultural land management policies. The restoration of irrigation systems would significantly improve drought resilience and agricultural productivity. Rehabilitation and modernization of drainage infrastructure would contribute greatly to increased productivity and reduced impact of extreme climate events. These measures are expected to yield satisfactory returns, combined with strengthening institutional capacity for irrigation system management.
13) Additional options include the use of small-scale irrigation systems, soil management technologies, and climate risk management measures (e.g., hail protection nets), as well as adjustments to crop rotation with an emphasis on perennial crops (vineyards and orchards), which are more resilient to climate change.
14) Participatory approach with the involvement of local stakeholders. This will be achieved through strengthened awareness-raising measures and the involvement of decision-makers to ensure a participatory approach in achieving the set objectives.
15) Improving the investment and business climate. Human and financial capital must be directed toward the implementation of this Strategy's objectives. Although many innovations offer significant benefits in terms of productivity, climate resilience, and drought mitigation, limited

financial resources at the farm level represent a major barrier to their adoption. Given these constraints, mitigation and adaptation options must be developed to specifically address the climate risks faced by local rural communities. Therefore, mitigation options that provide the highest return on investment from economic, social, and environmental perspectives should be prioritized and implemented to improve the resilience of agricultural systems and rural livelihoods.

SECTION 5. THREATS

The threats of the Strategy are as follows:

1) Global warming and climate change. According to recently conducted and published studies[7], the average annual temperature increased by 1.14°C during the period 1991–2020 compared to 1961–1990, while the amount of precipitation increased by 5 mm. A major risk for agriculture is represented by increasingly higher winter temperatures and longer periods without precipitation.
2) Increasingly severe droughts in recent years contribute to land degradation. According to studies[8], the region is exposed on average to agro-pedological drought for 32 days per year, extreme drought for 1 day, severe drought for 5 days, moderate drought for 11 days, and slight drought for 15 days. The analysis shows that both the duration and intensity of drought events are increasing.
3) Lack of financial resources to fund soil quality improvement projects. Budget allocations are very modest, with external funding remaining the main source of financing.
4) Degradation of agricultural land quality. Due to the increase in eroded areas and the intensification of drought phenomena in recent years, the quality of agricultural land is declining.
5) Lack of coordination and synchronization of policies and activities at the central level. State institutions have specific responsibilities to ensure the continuous implementation of established measures. Due to the nature of drought mitigation and land degradation neutrality, multiple levels of government are involved in risk assessment and management only in exceptional situations related to natural disasters. The land degradation neutrality process is not yet fully coordinated and synchronized by key institutions responsible for increasing mitigation capacity and resilience to this phenomenon.
6) Lack of clearly defined responsibilities for local authorities in addressing land degradation issues. Although a working group on the UNCCD Convention has been established and operationalized at the central level, with responsibilities for ensuring land degradation neutrality and mitigating drought effects, it is not represented at the local level. Accordingly, there is no regulatory framework at the local level that clearly defines responsibilities for addressing land degradation issues.
7) Unfavorable business and investment climate. Agricultural producers require more investment to achieve balanced business conditions and maintain sustainable agroecosystem productivity. High capital costs, low returns, long investment periods, and difficulties in accessing loans are the main barriers to developing infrastructure for a green economy.
8) Climate risks are not perceived as a shared social responsibility. Local leaders, public administration authorities, and other individuals and legal entities that own agricultural land, forestry assets, and constructions of any kind under a valid title, as well as their users, need to be involved in activities related to the use, improvement, conservation, and protection of natural resources.
9) Limited political influence of environmental authorities. Increased vulnerability and insufficient awareness of climate impacts indicate that existing environmental policies and measures have not yet produced the expected results. The Republic of Moldova does not have a policy

[7] http://www.meteo.md/index.php/clima/cercetari-climatice/
[8] Idem.

document directly targeting desertification control and drought mitigation and related activities. Existing policies addressing these phenomena have mainly relied on a reactive approach (crisis management) and traditional hierarchical command-and-control methods, making individuals and society as a whole dependent on government programs, resulting in increased vulnerability to desertification, land degradation, and drought phenomena.

10) Inadequate information among local private stakeholders. Creating a favorable environment and encouraging private actors to improve land degradation control processes, based on adaptive and resilience-oriented approaches, plays a crucial role in mitigating drought and climate risks, including poverty reduction and environmental protection. In recent years, authorities have pursued an ambitious reform program aimed at achieving sustainable growth through private sector initiatives; however, the results have not met expectations. The application of the legal framework adopted for this purpose (Law No. 179/2008 on public–private partnerships and Law No. 534/1995 on concessions) has been rather limited so far, but could increase depending on the extent to which service tariffs allow full cost recovery on a sustainable and consistent basis.
11) Increased rural depopulation. The national birth rate has shown a declining trend in recent years, both nationally and in the pilot area. Another issue is the mass migration of the able-bodied population from rural to urban areas and abroad. All these processes negatively affect environmental processes at the local level.

SECTION 6. CONCLUZIONS

Based on the SWOT analysis, the following conclusions can be drawn:

1) Natural conditions are quite favorable for cultivating a wide range of agricultural crops, including organic (bio) ones. A major advantage of the analyzed region is the possibility of expanding irrigated areas.
2) The large number of smallholder farms, with medium-sized holdings, provides the opportunity to implement various land improvement measures, including crop rotation and other advanced and modern agricultural practices.
3) The region maintains a high rate of land degradation, particularly due to the large share of arable land located on slopes.
4) Limited or even lack of funding, along with the absence of integrated environmental monitoring of these lands, does not allow for prompt intervention and consolidated mitigation measures to stabilize them.
5) Another drawback regarding the possibility of implementing land improvement works is the excessive fragmentation of agricultural land.
6) The proximity to the Dniester River, the availability of up-to-date and detailed pedological studies, as well as access to certain funding sources, provide opportunities to apply various measures in the near future to achieve land degradation neutrality.
7) Nearly all communes in the region are part of Local Action Groups, which diversify the opportunities for identifying different donors.
8) The main threats are related to climate change. In recent years, the frequency and intensity of droughts have increased, contributing to desertification and land degradation processes.
9) Comprehensive environmental monitoring in the pilot area is essential, given the impact of seasonal variability and climate change on water resources, agriculture, and regional development.
10) Efforts to protect and conserve the area must include reducing pollution, efficient water management, and the application of soil conservation technologies, in order to ensure favorable conditions for local agriculture and the well-being of communities in the region.

CHAPTER III. VISION AND OBJECTIVES

SECTION 1. VISION

The vision of the Strategy is focused on improving soil quality. Within this strategy, it is proposed to achieve the United Nations Sustainable Development Goal (SDG 15.3): "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought, and floods, and strive to achieve a land degradation-neutral world" for the pilot area.

The Republic of Moldova joined the global UNCCD Land Degradation Neutrality (LDN) initiative in May 2016, with the aim of prioritizing effective policy interventions "to achieve zero net loss of productive land/soils by 2030 and to enhance resilience to drought, adaptive capacity, and biodiversity services of agricultural ecosystems".

The Republic of Moldova is an active country within the framework of the UNCCD Convention and is making all efforts to achieve these targets by 2030. The main interventions for promoting the sustainability of the land sector and achieving the 2030 Development Agenda at the national level include:

- the creation of a "restoration fund" for the rehabilitation and ecological improvement of the condition and quality of degraded lands;
- the establishment of protective forest belts for agricultural land and soil conservation;
- increasing the national forest fund up to 15% in order to promote the sustainability of the land sector and contribute to enhancing biodiversity services and carbon stocks;
- remediation of sites contaminated with organic pollutants and prevention of new accumulation of pesticides, chemical substances, and other hazardous substances.

To ensure coherence between the voluntary LDN targets established at the national level and the objectives of the present Strategy, it is essential to ensure a harmonious integration of actions for the protection and sustainable management of natural resources. The objectives of the Strategy can support the implementation of LDN through concrete measures to combat soil erosion, reduce biodiversity loss, and improve water quality, thereby contributing to ecosystem resilience.

The established targets highlight the importance of sustainable management of land and forests, which are essential components for achieving LDN, with a particular focus on afforestation activities. The objectives assumed by the Republic of Moldova under the UNCCD Convention are focused on forest expansion, sustainable land management, and the restoration of degraded lands. These initiatives not only support LDN objectives but also contribute to broader environmental sustainability efforts.

SECTION 2. GENERAL AND SPECIFIC OBJECTIVES

The general objective of the Strategy is to address new planned environmental challenges in order to ensure land degradation neutrality, improve the quality, protection, and sustainable use of soil resources in the pilot area, in line with current national and European policies and strategies in the field of combating desertification and land degradation.

The establishment of specific objectives will be supported by targeted public policy measures, as follows:

a) centralization and assessment of data and information obtained from studies on natural hazards and risks affecting land degradation, carried out to date in the pilot area;

b) analysis of progress achieved at the national level in reaching land degradation neutrality and mitigating the effects of drought;

c) identification and assessment of projected environmental impacts based on climate change scenarios;

d) establishment of measures for the prevention, reduction, compensation, and monitoring of the effects of desertification on the environment;

e) public awareness of the phenomenon through the organization of debates and public consultations on the Strategy, and its endorsement by the competent authorities.

The specific objectives that will underpin the achievement of the general objective in the pilot area are the following:

Specific Objective 1. Expansion of forested areas and areas with protective functions:

- Expansion of forest area to 16% (currently 13.6%);
- Expansion of state-protected natural areas to 17% (currently 14.7%);
- Establishment of forest shelterbelts on agricultural land for erosion protection and soil conservation over an area of 64.4 ha;
- Rehabilitation of forest shelterbelts protecting agricultural land over an area of 1,000 ha.

Specific Objective 2. Implementation of land improvement projects:

- Application of hydrotechnical and phytoremediation measures on agricultural lands affected by gullies over a minimum area of 5 ha;
- Expansion of irrigated land by 130 ha;
- Introduction of agricultural crops with low water consumption;
- Reduction of degraded land area by 1,300 ha;
- Reduction of highly eroded land area by 120 ha;
- Conversion of arable land on slopes (with a certain degree of degradation) into forested areas.

Specific Objective 3. Improving land management practices:

- Financial incentives for the consolidation of small, fragmented land parcels;
- Promotion of good agricultural practices to prevent and combat soil degradation and nutrient losses;
- Implementation of sustainable soil resource management measures;
- Implementation of integrated water resources management measures.

Specific Objective 4. Elimination of sites contaminated with organic pollutants and prevention of new accumulation of pesticides, chemical substances, and other hazardous substances:

- Identification of sites contaminated with organic pollutants in the pilot area;
- Development of a remediation plan.

Specific Objective 5. Social measures: public information, awareness, and environmental education:

- Continuous monitoring of environmental quality and condition in the pilot area;
- Environmental risk mapping;
- Operational analysis of environmental monitoring networks, with regard to their expansion;
- Organization of information, awareness-raising, and environmental education campaigns for the population, especially for local public authorities and farmers in the pilot area;
- Provision of access to environmental monitoring systems for decision-makers in the pilot area, supplying necessary information on hydrometeorological conditions and the quality of air, water, and soil, etc.

CHAPTER IV. IMPACT

The overall impact of achieving Land Degradation Neutrality (LDN) begins with the assessment and strengthening of an enabling environment, namely responsible institutions, developed policies, involved human resources, and capacities that must exist across all key sectors to support the implementation of the Strategy. An integrated landscape-scale approach, which aims to reconcile multiple objectives of sustainable agricultural productivity, ecosystem conservation, and livelihoods, can be achieved through collaboration among these sectors, the promotion of synergies, the management of trade-offs, and the involvement of multiple stakeholders.

Conform According to the LDN response hierarchy, avoiding ecosystem degradation is a priority. Sustainable land management and landscape-level restoration are integral to achieving LDN and are necessary to improve living standards, ensure food security, protect soils and rivers, enhance nutrient cycles, and create resilient conditions in the face of climate uncertainties. By implementing sustainable land management practices, land degradation can be avoided, reduced, or reversed (according to the UNCCD response hierarchy), enabling progress toward a land degradation-neutral world (SDG 15.3). Consequently, these changes are expected to impact the proportion of degraded land in the total land area (SDG indicator 15.3.1).

To assess this indicator, the Good Practice Guidance (GPG) (Sims et al., 2017; Sims et al., 2021), developed by UNCCD, recommends calculating three indicators of state change:

(1) trends in land cover,
(2) trends in land productivity or land function, and
(3) trends in carbon stocks (in vegetation and soil).

Monitoring datasets (land use/land cover, soil carbon content, erosion levels, etc.) play an important role in deriving these indicators, particularly for assessing changes in land productivity and land cover dynamics.

To achieve these objectives, interventions must be applied at the field (parcel) level, and projects and decision-makers should rely on land-use decisions, variables, and additional locally validated indicators before initiating interventions to ensure evidence-based decision-making. This gap is often difficult to address, and there is a need for a better understanding of the various methods and tools to select reliable indicators and monitor them across different spatial and temporal scales..

Sustainable land management (SLM) and land-use planning indicators are necessary for monitoring progress toward LDN, especially at the local planning level. It is important to build on all efforts made to achieve LDN, as over time these additional indicators can lead to a change in land status while simultaneously contributing to the reversal, avoidance, and reduction of land degradation. There is ongoing development of tools to improve monitoring information in order to better understand this process.

The implementation of Specific Objective 1 will directly contribute to achieving LDN by increasing forest cover, which is essential for preventing soil erosion, enhancing carbon sequestration, increasing soil water content, and improving overall land productivity. The expansion of forests is a universal solution for combating land degradation.

The implementation of Specific Objective 2 involves direct (technical) interventions in land degradation processes and предусматри́ев mechanized anti-erosion works (as a priority). The main drawback is that such works are very costly; therefore, it is assumed that these interventions will be carried out in critical areas.

The achievement of Specific Objective 3 is mainly related to environmental education for farmers and the rural population in the region, but also includes practical activities for the development and implementation of crop rotation systems, which are currently lacking. This is a long-term activity, but it can ensure future success. Its advantage lies in its relatively low implementation cost.

The fulfillment of Specific Objective 4 involves the identification and assessment of sites affected by persistent organic pollutants (POPs) or other hazardous substances, as well as the development of a remediation plan.

The achievement of Specific Objective 5 is mainly focused on informing, raising awareness, and providing environmental education to the population in the pilot area, and includes targeted measures to ensure continuous monitoring of environmental quality and conditions in the area. Institutional measures will be undertaken, with the involvement of relevant specialists, for environmental risk mapping. Under the auspices of the State Hydrometeorological Service, an operational analysis of environmental monitoring networks will be ensured, with conclusions and proposals regarding the expansion of monitoring points for both the qualitative and quantitative state of the environment in the pilot area. Information and awareness campaigns, as well as environmental education activities, will be organized, particularly targeting local public authorities and farmers in the pilot area. The central specialized authority, together with its subordinate structures, will provide decision-makers in the pilot area with access to environmental monitoring systems, supplying necessary hydrometeorological information and data on air, water, and soil quality, etc.

The LDN Strategy aims to implement the principles of land degradation neutrality and soil protection, and seeks to achieve multiple benefits and impact categories aligned with sustainable development and the protection of natural heritage. The implementation of the Strategy will provide a fair, efficient, and timely framework for the development of the entire sector. Local action plans, developed and implemented to support the Strategy's objectives, will propose solutions to address the major challenges related to land use, protection, and conservation, the afforestation of degraded lands, and climate change adaptation. The Strategy also provides opportunities to fulfill commitments related to limiting land degradation and achieving neutrality, as included in the Government's agenda, including the Association Agreement with the European Union.

The action directions established within the general objectives will primarily stimulate: the development of long-term investment plans to ensure a green economic development pathway; the creation of new opportunities for the large-scale use of technological innovations; and access to technical and capacity-building assistance for the implementation of climate change mitigation and adaptation projects, with a positive impact on soil conservation, afforestation, and related areas.

The modernization of the soil quality monitoring and control system will enable a better understanding of the state of environmental components and will contribute to the development of targeted policies addressing the most acute issues in the field. Improving the quality of environmental data will ensure high-quality, comparable, and relevant presentation of environmental information and data, including at the European level.

Therefore, as a result of implementing the objectives and actions set out in the LDN Strategy, the following outcomes are expected:

- soil protection requirements are integrated into agricultural development planning;
- agricultural activities impacting soil are subject to a coherent and transparent permitting system and are monitored more effectively to prevent environmental non-compliance;
- forest area expanded to 16%;
- increased efficiency in the consumption and use of land resources;
- transition toward a green and circular economy ensured, etc.

The principles of the Aarhus Convention will be implemented through mechanisms ensuring public access to information, participation, and access to justice, improving cooperation, and fostering partnerships with the civil society sector and scientific research institutions. As a result, information regarding the state of land resources in the region will be accessible to all interested citizens.

CHAPTER V. GENERAL RECOMMENDATIONS AND ACTION PLAN FOR ACHIEVING LAND DEGRADATION NEUTRALITY IN THE PILOT AREA

Climate change and anthropogenic impact represent major challenges affecting ecosystem sustainability[9]. In order to manage ecosystems in a sustainable manner, it is necessary to understand anthropogenic impacts at the local scale. These can be divided into five major categories: urban development, forest fragmentation, pressures on soil and vegetation, pressures on wildlife, and other types of intentional or unintentional threats (e.g., vandalism, fire ignition, etc)[10]. In addition, humans contribute to environmental degradation both through population growth and through a range of activities aimed at the exploitation and use of natural resources, whose short-term economic value is often more profitable than their long-term conservation[11]. The importance of reducing the negative impact of anthropogenic activities on the environment was first highlighted in 1972 in Stockholm, through the *Declaration on the Environment*.

With regard to the agricultural ecosystem, it has recently been observed an increase in the amount of land taken out of agricultural use, which has led to a substantial expansion of land occupied by buildings, roads, and railways. As a result of the irrational use of soils, or due to industrial influence through pollution processes, there is a need for the ecological restoration of degraded lands or lands affected by various restrictive natural factors (climate, topography, edaphic conditions) or anthropogenic factors. The continuous decline in soil nutrient availability (nitrogen, phosphorus, potassium) and the decrease in soil humus content are among the restrictive factors with repercussions on production, its quality, and increased production costs. Lands in steppe and forest-steppe zones, which are at high risk of drought and desertification, can be classified as fragile areas facing demographic, economic, and natural risk-related challenges, generating a range of dysfunctions.

The importance of balanced management of agricultural land is increasingly emphasized, including due to the intensification of extreme climatic events in our country, with major negative effects on agricultural productivity and financial outcomes. Both agricultural research specialists and farmers point out that, in order to achieve sustainable agricultural performance, research and innovation programs in agriculture are incomplete without components related to irrigation and agroforestry shelterbelts.

The prevention and control of degradation processes are based, on the one hand, on land improvement works, and on the other hand, on agro-pedo-improvement measures and specific cultivation technologies. In certain situations, it is advisable to change the land use, namely through afforestation or grassing (re-vegetation).

Agricultural areas are most affected by frequent drought, low organic matter content, rainfall-induced erosion and landslides, temporary water excess, low levels of available phosphorus and nitrogen, soil compaction, etc.

Agricultural ecosystems

The large area of agricultural land affected by various forms of degradation is caused, among other factors, by the lack of erosion prevention measures, improper use of fertilizers and pesticides, excessive use of heavy agricultural machinery, poor management of irrigation systems and other land

[9] Popradit A., Srisatit T., Kiratiprayoon S., Yoshimura J., Ishida A., Shiyomi M., Murayama T., 2015. Anthropogenic effects on a tropical forest according to the distance from human settlements. Scientific Reports 5:14689, DOI: 10.1038/srep14689.
[10] Referowska-Chodak E., 2019. Pressures and threats to nature related to human activities in European urban and suburban forests. Forests 10, 765; doi:10.3390/f10090765
[11] Grigorescu A., Frinculeasa M.N., Chitescu R.I., 2020. The socio-economic value of protected areas. The Bucegi Natural Park. Management Dynamic in the Knowledge Economy, 8(1), pp. 61-79. DOI 10.2478/mdke-2020-0005, ISSN: 2392-8042.

improvement works, etc. The use of good agricultural practices represents an extremely effective tool in the fight against land degradation and desertification.

Considering the negative effects of desertification, including reduced soil productivity and food production, destruction of vegetation, and decreased resilience of land to climate change, preventing desertification and land degradation through the application of the most effective measures is essential.

Most of the measures listed below are included in the Technical Regulation "Soil Protection Measures within Agricultural Practices," approved by Government Decision on 07.05.2025 (unique number 158/MAIA/2025) of the European Union. Thus, in the agricultural sector, the following measures are recommended to prevent degradation/desertification phenomena:

1) *Application of crop rotation and crop succession* – a measure aimed at reducing the loss of organic matter and soil erosion caused by surface runoff. Crop rotation refers to the succession of crops over time and space, accompanied by an appropriate system of soil tillage and fertilization, which ensures increased soil fertility, improved quantity and quality of production, and the optimization of agricultural land use. Crop succession is a complementary concept to crop rotation and refers to how crops follow one another over time on the same plot or soil.
2) *Performing vertical soil loosening without soil inversion*- a measure that helps reduce organic matter loss and soil erosion caused by surface runoff and involves loosening and mobilizing the soil to a depth of 20–30 cm, or even deeper, without inverting the soil layer. After sowing, the soil surface remains covered with crop residues at a proportion of approximately 30%, and soil compaction is reduced in the short term.
3) *Reducing soil compaction* – a measure aimed at avoiding excessive machinery passes and promoting the use of appropriate machinery systems that can perform multiple technological operations in a single pass. These include: soil tillage at optimal (appropriate) moisture, reducing the number of passes over the soil surface, limiting soil pressure (using tracks or low-pressure tires), long-term crop rotations with soil-improving crops, varying tillage depth, restricted use of disc harrows, and ensuring balanced fertilization and a positive humus balance.
4) *Selection of an optimal irrigation technology* – a land improvement measure that involves the controlled application of water, in addition to natural precipitation and groundwater contribution, to meet crop requirements and ensure high and stable yields. It is the main measure for combating the effects of drought on crops and is sometimes used in combination with drainage to improve saline soils or to prevent salinization of irrigated and/or drained soils.desecate.
5) *The rehabilitation of existing irrigation systems and the introduction of new irrigation systems* represent primary engineering solutions applied in rural areas for the control and regulation of environmental factors over time. The design, implementation, and operation of land improvement works are based on understanding and managing the water factor within the continuous soil–plant–atmosphere system, which must be permanently controlled in the interest of environmental protection and sector profitability.
6) *The terracing of sloping land for water retention on hillsides* is generally applied to enable agriculture on slopes where gradient and soil depth would normally limit cultivation, as well as to reduce runoff and enhance the soil's water retention capacity. Terracing involves shaping slopes into step-like structures that help reduce or prevent erosion while improving conditions for the cultivation of vineyards and fruit trees. Terracing offers numerous technical, economic, and hydrological advantages, among which the most important are: regulation of surface runoff due to slope reduction; control of both surface and gully erosion; and improved water supply to plants as a result of enhanced water retention and infiltration in the soil. Maintaining existing terraces prevents erosion and supports the conservation of traditional landscapes.
7) *The establishment of annual cover crops (green crops)* involves sowing an intermediate crop between the harvesting of the main crop and the planting of the next one, with the aim of

protecting bare soil. The selection of cover crops depends on available time, vegetation development, soil conditions, soil moisture, and the requirements of the subsequent main crop.

8) *The implementation of double seeding* consists of increasing the seeding density—particularly when cereals are sown in valley bottoms—by doubling the standard rate. This significantly reduces water runoff and decreases soil susceptibility to erosion. Double seeding is carried out in strips along contour lines or in valley bottoms, complementing the initial sowing stage.
9) *The expansion of conservation agriculture systems* ensures the preservation, improvement, and more efficient use of natural resources through integrated resource management. This practice enhances biodiversity and biological processes that sustain soil functionality and enables the provision of multiple ecosystem services at a larger scale, particularly carbon sequestration, improved water quality, reduced erosion and runoff, and biodiversity conservation. According to FAO (FAO, 2014a), conservation agriculture is an approach to agroecosystem management aimed at achieving increased productivity, sustained profitability, and high food security, while preserving and improving environmental conditions. It is characterized by:
    a) a) reduced mechanical soil disturbance, with or without minimal tillage;
    b) b) permanent soil cover, especially through crop residues and cover crops;
    c) c) diversification of cultivated plant species or crop rotations;
    d) d) farmer participation in the development and commercialization of advanced equipment;
    e) e) a shift in mindset and increased awareness of the need to move away from conventional practices;
    f) f) medium- and long-term monitoring of conservation agriculture elements;
    g) g) appropriate crop and land management practices.

Hydrological measures

1) *Measures to mitigate water erosion* – the arrangement of the watershed of torrential formations through works aimed at reducing runoff from slopes. Within erosion-affected formations, interventions are recommended to halt their expansion in length, width, and depth, including stabilization of the gully head and the construction of transverse structures (check dams, barriers) using local materials. For the prevention and control of land degradation, both the construction and maintenance of embankments in inhabited areas, as well as the rehabilitation of watercourses and floodplains, are recommended.
2) *Improving lateral connectivity and water retention capacity in floodplain areas* can help mitigate impacts on the hydrological regime caused by river engineering works, including the restoration of groundwater levels. The reconnection of polders previously established for agriculture or aquaculture represents an effective approach to wetland restoration. Reconnecting oxbow lakes and side channels aims to restore natural processes. The restoration of degraded wetlands can regulate sediment dynamics by reducing flow velocity and enhancing sediment deposition.
3) *Construction of compensation reservoirs* – water storage on third- and fourth-order tributaries before discharge into the main river, through compensation reservoirs built along or near watercourses. The mitigation of rapid flow fluctuations depends on the storage capacity of the reservoir. Where capacity is sufficient, discharge variability can be significantly reduced or fully attenuated.
4) *Creation of new wetlands, with stagnant or flowing water*, to enhance water retention in agricultural, forested, and urban areas. Establishing new wetlands also involves technical measures such as removing embankments, carrying out excavation works, and creating channels to enable controlled flooding. Wetlands can be created both by relocating embankments and by reconnecting oxbow lakes and lateral channels.
5) *Establishment of buffer zones along rivers and canals,* which provide multiple benefits: reduced flow velocity; control and reduction of erosion and sediment loads; decreased flood risk; filtration and retention of pollutants; prevention of water body degradation and improvement

of surface water ecological status; protection of ecosystems and promotion of green infrastructure; increased water infiltration and aquifer recharge; and improved soil quality.

6) *Implementation of rainwater harvesting and utilization systems* involves the development and promotion of systems for collecting rainwater from rooftops, sloped lands, and urban drainage systems, in order to reduce water losses through evaporation and improve water resource management. Collected water can be used for irrigation and other purposes.
7) *Optimization or elimination of lakes with excessive evaporation* – in the context of climate change and increasing water scarcity in the Republic of Moldova, efficient water resource management requires reducing water losses. Artificial lakes that do not provide significant ecological or economic benefits and contribute substantially to evaporation should be reassessed and, where appropriate, decommissioned or repurposed for more efficient uses.
8) *Restoration and (re-)naturalization of riverbeds* – river naturalization is essential for improving water quality, reducing soil erosion, and restoring aquatic ecosystems. Currently, many rivers in the Republic of Moldova are affected by anthropogenic alterations such as excessive embankment, forced channelization, and pollution, leading to biodiversity loss and significant water losses through evaporation and uncontrolled infiltration.

Conservation and improvement of soil quality

1) *Prevention of soil crust formation* involves increasing the amount of plant residues on the soil surface, which improves soil aggregation and reduces the tendency for crust formation. In addition, minimum tillage and no-till systems can be applied to reduce the occurrence of these processes at the soil level. At the same time, avoiding soil compaction contributes to reducing erosion risk by improving water infiltration.
2) *Measures for the improvement of saline soils* require the implementation, over a period of 5–8 years, of land improvement works and differentiated interventions depending on the type of salinization, groundwater depth, and mineralization level. The main land improvement measures include: construction of collector and drainage canal networks for removing excess water and surface ponding; leaching practices to remove soluble salts from saline soils; installation of drainage systems in reclaimed areas to evacuate saline wash waters; and the implementation of mole drainage at shallow depths (0.6–1.0 m) and short distances (50–70 m), etc.
3) *Measures to prevent soil degradation through structural breakdown and crusting* include: performing soil operations, harvesting, and transport only under optimal soil moisture conditions; avoiding the creation of an excessively fine seedbed, which can lead to physical degradation processes such as structural breakdown, pore clogging, and crusting; maintaining at least 30% crop residues on the soil surface; applying irrigation water according to crop requirements; implementing diversified crop rotations with properly staggered crops, including at least 20% legumes and rotational plots with perennial grasses; and applying organic fertilizers and soil-improving crops in long-term rotations.
4) *Measures to prevent soil compaction* include: deep mechanical loosening depending on the depth of compaction; periodic deep loosening (every 3–4 years) on soils affected by anthropogenic compaction; reducing axle load of agricultural machinery and establishing maximum permissible limits based on soil type and moisture conditions; minimizing traffic on the soil surface; conducting all field operations according to soil texture conditions; and including in crop rotations plant species with strong penetration capacity or deep root systems.
5) *Measures to prevent and control soil pollution* include proper management and monitoring of pollution sources, particularly heavy metals; correction of soil acidity through the gradual application of liming materials to reduce acidity and, consequently, the mobility of heavy metals; and balanced mineral and organic fertilization based on soil nutrient status, texture, and reaction.
6) *Measures to prevent and reduce nutrient losses in soils* include adopting management practices such as: amendment of acidic soils; use of appropriate phosphorus sources; selection of optimal

timing, methods, and doses of fertilization; ensuring balanced plant nutrition; selecting plant species or genotypes with efficient phosphorus use; maintaining adequate soil moisture; improving soil organic matter content; controlling soil erosion; and managing pests, diseases, and weeds.

7) *Monitoring of environmental factors and agricultural soil quality* will be carried out through dedicated programs and targeted studies on the coverage of environmental and hydrometeorological monitoring systems. Methodologies for drought assessment and for the organization of soil quality monitoring will be implemented to ensure the monitoring of all categories of agricultural land across different soil subtypes.

Other types of erosion/degradation

1) *Wind erosion control* involves a set of ameliorative measures, including rational land-use planning, reducing the degree of sand loosening, decreasing wind velocity, and ensuring a favorable soil moisture regime. To control or mitigate wind-induced soil erosion, measures will include improving hydrological conditions (enhancing infiltration and groundwater recharge); restoring native/natural pastures; increasing vegetation cover and species diversity; establishing shelterbelts in combination with crop mulching; and imposing restrictions on grazing on sloping or sandy lands.
2) *Landslides* are addressed through two categories of measures and works: preventive measures, targeting the causes of landslides, and curative measures, addressing their effects. Territorial measures aim to avoid overloading slopes with additional pressure. Technical measures include hydraulic structures acting on the causes of landslides, such as open channels or stone drains (1–2 m deep), systematic horizontal subsurface drainage, and spring water capture. Stabilization of landslide masses can be achieved through slope-installed barriers (fences), retaining walls equipped with stone or gravel drainage systems. Biological measures (afforestation) are implemented after stabilization works and land reshaping (e.g., drainage of micro-depressions, land leveling) have been completed.
3) *Changes in land-use categories* lead to complex impacts on carbon sequestration in soils, often resulting in a significant reduction of stored carbon, with implications for the natural carbon cycle. Changes in vegetation cover also contribute to climate change by altering surface albedo and increasing emissions of greenhouse gases (such as methane and nitrous oxide). Therefore, spatial planning documents must consider the effects of land-use changes on the ecological balance of the area.
4) *Grassland management* – the designation and planning of pasture management at the level of administrative-territorial units are based on georeferenced national datasets provided by relevant institutions. Local councils are required to develop local pasture management plans covering all grasslands within their jurisdiction. Funding for the development of permanent grassland management plans is provided from the state budget as well as local budgets.

Forest ecosystems

1) *Increasing forested areas* should primarily be achieved through the afforestation of degraded and marginal lands unsuitable for efficient agriculture, as well as through the establishment of protective forest belts for agricultural crops, riverbanks, embankments, and infrastructure. These measures also serve to protect communication and transport routes—especially against snowdrifts—as well as settlements and various economic and social assets. The objective is to increase the national forest area by promoting afforestation of both agricultural and non-agricultural lands, thereby contributing to soil erosion reduction, improved water retention capacity, and the restoration and conservation of local biodiversity.
2) *Afforestation of degraded and agriculturally unsuitable lands* – newly established forested areas on agricultural and non-agricultural lands, particularly in plains and hilly regions, will have positive effects on the local climate. These include mitigating the impacts of severe droughts, improving the local climate and soil water regime, and reducing evaporation and plant

transpiration. In hilly regions, afforestation contributes to reducing soil erosion, enhancing water retention capacity, and mitigating flood risks and the negative impacts of flash floods. Targeted areas include lands affected by gullies and landslides, sandy soils (including shelterbelts), and saline soils, all characterized by difficult conditions.

3) *Establishment of energy crops (herbaceous and woody)* plays an important role in increasing the capacity for atmospheric CO_2 sequestration and in soil restoration and stabilization. At the same time, biomass energy potential represents a sustainable resource for the renewable energy sector. Target areas include lands with excess water in floodplains or marshy areas within small and medium river basins, which are suitable for the cultivation of energy crops.
4) *Planting and/or conservation of riparian vegetation* aims to improve riverbed stability, aquatic habitats, and terrestrial biodiversity in riparian zones. Riparian vegetation can also enhance water infiltration and reduce sediment input into surface waters. Ecological improvements may be achieved over longer periods but are sustainable in the long term. Additional measures include: promoting drought-resistant species and increasing species diversity in forestry and agriculture; preventing forest fires through the installation of monitoring and early warning systems; and implementing financing mechanisms and incentives for afforestation, reforestation, and biodiversity conservation in protected areas. All these measures are essential for increasing forest cover (including shelterbelts) and restoring forested areas using available funding sources.
5) *Ecological restoration of forests* – recommended actions include mapping to identify current soil productivity (site quality), the use of reproductive material adapted to present conditions, and the application of specific techniques and technologies for the establishment and maintenance of new forest stands. Furthermore, ecological restoration should also target other forest categories characterized by poor phytosanitary conditions. In such cases, in addition to specialized silvicultural treatments, it is recommended to strengthen measures for pest prevention and control, as well as to improve forest structure and species composition through targeted interventions.

Social measures

1) *Ensuring water supply from groundwater sources for local consumption.* There are rural localities where, in addition to the absence of piped water supply systems, there are no accessible sources of drinking water (wells) within households. The main reason is that the groundwater table is located at significant depths, and residents lack the financial capacity to construct their own wells. Therefore, a coordinated, centralized approach at the community level is required to address these challenges.
2) *Enhancing awareness, knowledge, and engagement among populations in areas with a high risk of aridity, as well as among farmers and local authorities, through the following measures:*
    a) Promoting awareness of biodiversity conservation and improvement, particularly in urban areas, by increasing both the extent and quality of green spaces, preventing the degradation of urban ecosystems, and supporting their restoration.
    b) Strengthening the capacity of public advisory services in the field of soil protection by encouraging the implementation of research results at the level of local communities.
    c) Informing populations in areas at high risk of soil degradation, as well as farmers, landowners, and local authorities, about sustainable land-use methods and techniques for improving soil quality, including measures to prevent land fragmentation.
    d) Enhancing expertise and competencies among landowners and farmers through training programs focused on soil protection and improvement.
    e) Supporting the development of social enterprises engaged in land management activities and interventions aimed at improving soil quality.
3) *Direct financial support granted to landowners and communities for interventions aimed at achieving Land Degradation Neutrality, through the following measures:*

a) Proper spatial planning, taking into account the current and potential impacts of climate change.
b) Development and implementation of financial support mechanisms providing compensation to owners of degraded lands, as well as support for actions aimed at improving soil quality.
c) Development of technical standards for determining the total economic value of forests and other forested lands, and implementation of an economic valuation system at regional and national levels, in relation to their ecological, economic, and social functions. The expected outcome of this measure is the economic valuation of forest resources at local and regional levels, reflecting their ecological, economic, and social functions.

4) *Supporting research and innovation activities to identify solutions tailored to national environmental conditions, aimed at preventing and combating soil degradation and enhancing the resilience of different soil types:*
   a) Increasing funding allocated to research in the field of combating desertification and adapting to specific soil conditions.
   b) Supporting environmental risk mapping activities, including the development of an integrated soil quality monitoring system and the integration of data with other systems for observing spatial and temporal dynamics of environmental indicators.

Proposed measures, expected results, monitoring and evaluation indicators, responsible institutions, funding sources (2026-2030 period).

The overall progress towards achieving the objectives of the LDN Strategy will be assessed based on the following indicators:

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
SPECIFIC OBJECTIVE 1. EXPANSION OF FORESTED AREAS AND AREAS WITH PROTECTIVE FUNCTIONS					
1.1	Expansion of forest area	▪ Forested area (ha)	+3,4 thousands ha	30 – 50 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027
1.2	Expansion of the area of protective forest belts	▪ Area of forest belts (ha)	+2,1 thousands ha	~63,3 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027
1.3	Expansion of state-protected natural areas	▪ PNA area (ha)	+385 ha	25 – 40 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					and the Action Plan for its implementation for 2023–2027
1.4	Planting and/or preserving riparian vegetation	▪ Restored area (ha)	1,8 thousands ha	4,5-16 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027
1.5	Promoting energy crops and the use of residual forest biomass resources	▪ Amount of biomass used (tons) ▪ Increase in the share of renewable energy in final energy consumption	1,8 thousands ha	Development of energy crops: 20,000–25,000 lei/ha in the first year. Collection and processing of forest biomass: 200–350 lei/t.	▪ State budget, external funds, public-private partnerships. ▪ National Rural Development Program (PNDR). ▪ National Plan "Building a European Moldova", ▪ RO-MD Cross-Border Cooperation Program
1.6	Ecological restoration of forests affected by drought and other harmful factors, or those that are structurally and functionally inappropriate.	▪ Restored area (ha)	8,7 thousands i ha	1,5 – 2 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027
1.7	Rehabilitation of protective forest belts for agricultural land	▪ Restored area (ha)	918 ha	22 – 35 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027 ▪ GEF8 Project (FAO) for the period 2026–2030. ▪ Rural Resilience Project (PRR) – IFAD UCIP ▪ "Development of the Community Forestry Sector in Moldova" Project – BioCarbon Fund
1.8	Protection of forests through appropriate pest and disease control (biological control methods, etc.) and grazing in forests	▪ Annual reports ▪ Number of interventions	17,5 thousands ha	Chemical treatments: 1,000–5,000 lei/ha. Biological treatments: 1,500–3,000 lei/ha.	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
				Mechanical treatments: 3,000–4,000 lei/ha.	implementation for 2023–2027
1.9	**Monitoring the health of forests and forest soils**	▪ Annual reports ▪ Number of studies conducted ▪ Percentage of forests monitored annually ▪ Number of soil and vegetation samples analyzed	17,5 thousands ha	2 thousands lei/ha annually	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027
1.10	**Forest fire prevention and containment**	▪ Case studies ▪ Forest area protected against fires (ha)	17,5 thousands ha	4,7 – 13,9 thousands lei/year	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027 ▪ The "EU4 Moldova Resilience – A Secure State, Strong Communities" Project
1.11	**Improving the system for monitoring and observing the effects of destabilizing biotic and abiotic factors**	▪ Number of systems implemented ▪ Percentage of forests monitored	17,5 thousands ha	13,5 thousands lei/ year	▪ State budget, external funds, public-private partnerships. ▪ The National Forest Expansion and Rehabilitation Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027
	SPECIFIC OBJECTIVE 2. IMPLEMENTATION OF LAND IMPROVEMENT PROJECTS Conservation/improvement of soil quality				
2.1	**Application of hydrotechnical and soil-improvement measures on agricultural land affected by gullies**	▪ Area of land affected by gullies where hydrotechnical and phytosanitary measures have been implemented (ha)	463 ha	165–310 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ The "Capacity Building for Rural Transformation" (TRTP) project ▪ The World Bank's "Competitive Agriculture in Moldova" (MACP) ▪ The "Emergency Support for Agricultural Producers in the Context of the Socio-Economic and Energy Crisis" project of the FAO and the United Nations Development Programme

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					(UNDP)
2.2	**Expansion of irrigated land**	▪ Area of irrigated land (ha)	+ 1,3 thousands ha	60 – 180 thousands lei/ha	▪ State budget, local budget, external funds, public-private partnerships. ▪ Small-Scale Irrigation System Development Program (PDSISM) ▪ Grants provided by UCIP IFAD
2.3	**Implementation of water-efficient crops**	▪ Area under low-water-use crops (ha) ▪ Reduction in water use for irrigation (%) ▪ Number of farms adopting efficient irrigation techniques and drought-resistant crops ▪ Water use efficiency in that agricultural sector (liters of water per kilogram of product)	23,2 thousands ha	71 – 123 thousands lei/ha	▪ State budget, local budget, external funds, public-private partnerships. ▪ Agency for the Development and Modernization of Agriculture (ADMA): Project for the Modernization of Agricultural Technology and Equipment (MAME). Program for the Development of Small-Scale Irrigation Systems (PDSISM). ▪ Agency for Intervention and Payments in Agriculture (AIPA). ▪ "Capacity Building for Rural Transformation (TRTP)" program funded by the International Fund for Agricultural Development (IFAD). ▪ International projects and partnerships ▪ The "Emergency Support for Agricultural Producers in the Context of the Socio-Economic and Energy Crisis" project of the FAO and the United Nations Development Programme (UNDP)
2.4	**Reducing the area of degraded land**	▪ Preventing and combating soil erosion, ha	- 2,3 thousands ha	10 – 20 thousands lei/ha	▪ The state budget, external funds, international organizations and development agencies, private funds and investments. ▪ The National Energy and Renewable Energy Program (PNERP) for 2023–2032 and the Action Plan for its implementation for 2023–2027 ▪ The United Nations

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					Development Programme (UNDP)
2.5	Reducing the area of severely eroded land	▪ Preventing and combating soil erosion, ha	- 594 ha	64,2 thousands lei/ha	▪ Grants for land improvement and soil conservation projects from AIPA. ▪ The 2021–2025 Land Improvement Program
2.6	Conversion of sloping arable land (with a certain degree of degradation) into forests	▪ The number of hectares of sloping arable land that have been converted into forests	331 ha	9,5 – 13,5 thousands lei/ha	▪ State and local budgets; ▪ AIPA, the Grant Program for Sustainable Land Management; ▪ FEN, external funds
2.7	Increasing the amount of plant residues on the soil surface to improve aggregation and thereby reduce the tendency for crust formation, together with the application of minimum tillage and no-tillage systems	▪ Increasing the amount of plant residues applied to the soil to improve soil aggregation. ▪ Reducing soil crust formation.	6,6 thousands ha	7 – 11,5 thousands lei/ha	▪ State budget, local budget, external funds, public-private partnerships. ▪ Grant program for sustainable land management (SLM) ▪ Grant program to facilitate farmers' access to markets
2.8	Management measures to reduce soil carbon loss	▪ Reducing CO_2 emissions ▪ Increasing organic matter content ▪ Improving soil biodiversity	1,3 thousands ha	33- 70 thousands lei/an	▪ The state budget and international funds ▪ The Green Economy Financing Facility (GEFF) of the European Bank for Reconstruction and Development (EBRD) ▪ The AgreenaCarbon Program
2.9	Management measures for the remediation of saline-affected land	▪ Restoration and improvement of soil fertility in salt-affected areas, ha	2 thousands ha	12 – 23,5 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ Grant Program for Sustainable Land Management (MDT), (UCIMPA) ▪ Grants for Land Improvement and Soil Protection Works, and the Agricultural Technology and Equipment Investment Grant Program (AIPA)
2.10	Management measures to prevent degradation through disintegration and crusting	▪ Total area of agricultural land protected against erosion, ha	662 ha	35 – 55,5 thousands lei/ha	▪ State budget, external funds, public-private partnerships. ▪ Grant Program for Sustainable Land Management (SLM) ▪ Agency for Intervention and Payments in Agriculture (AIPA)
2.11	Measures to prevent	▪ Area of land affected by	331 ha	1,3 -3,3	▪ State budget, external

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
	soil degradation caused by compaction	compaction, ha		thousands lei/ha	funds, public-private partnerships. ▪ The Agency for Intervention and Payments in Agriculture (AIPA), subsidies, and the "Sustainable Land Management" (MDT) post-investment grant program.
2.12	Management measures to prevent and control soil pollution	▪ Area of rehabilitated eroded land, ha	33,1 thousands ha	15 – 25 thousands lei/ha	▪ State budget, external sources. ▪ The "Support for the Implementation of the Association Agreement" project (EU4Environment) ▪ The "Strengthening the Resilience of Communities Vulnerable to Climate Change" Project (UNDP) ▪ The "Reducing Land Degradation and Sustainable Grassland Management" Project (FAO, UNDP, Ministry of Agriculture)
2.13	Management measures to prevent and control nutrient loss in the soil	▪ Area of land protected from erosion and soil degradation, ha	33,1 thousands ha	3 – 5 thousands lei/ha	▪ State budget, external sources. ▪ The "Support for the Implementation of the Association Agreement" project (EU4Environment) ▪ The "Strengthening the Resilience of Communities Vulnerable to Climate Change" project (UNDP) ▪ The "Reducing Land Degradation and Sustainable Grassland Management" project (FAO, UNDP, Ministry of Agriculture)
2.14	Amending acidic and alkaline soils	▪ Area of improved land, ha	132 ha	1,3 – 3,2 thousands lei/ha	▪ State budget, external sources. ▪ AIPA (Agency for Agricultural Interventions and Payments) subsidies ▪ National Rural Development Program (PNDR) ▪ National Ecological Fund ▪ EU Neighborhood Instrument
Prevention of other types of erosion/degradation					

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
2.15	Design and implementation of erosion control measures for the years 2025–2030	▪ Protected land area, ha	1,3 thousands ha	70,5-161,5 thousands lei/ha	▪ State budget, external sources. ▪ Interreg NEXT Romania-Republic of Moldova Program 2021–2027 – EU
2.16	Change in land use classification	▪ The (positive) change in albedo and the reduction in greenhouse gas emissions	662 ha	21 – 60 thousands lei/ha	▪ State budget, external funds. ▪ "Sustainable Land Management" post-investment grant program, AIPA
2.17	Restoration of land degraded by human activity (mining operations, waste dumps, contamination with hydrocarbons, heavy metals, etc.) and reforestation	▪ Area of land rehabilitated, ha	132 ha	17 – 40 thousands lei/ha	▪ State budget, external funds. ▪ Grant program for sustainable land management (SLM)
2.18	Pastures management	▪ Area of established pastures, ha	8,6 thousands ha	5 – 12 thousands lei/ha	▪ State budget, external funds. ▪ Grant program for sustainable land management (SLM)
	SPECIFIC OBJECTIVE 3. IMPROVING THE MANAGEMENT OF LAND AND AGRICULTURAL ECOSYSTEMS Land management				
3.1	Financial incentives for the consolidation of small, fragmented parcels of land	▪ Area of consolidated land, ha	662 ha	6–15 thousands lei/ha	▪ State budget, external funds. ▪ Grants for land improvement, soil enhancement, and soil protection projects. ▪ Incentives for the consolidation of agricultural land, AIPA
3.2	Promoting good agricultural practices to prevent and combat soil degradation and nutrient loss	▪ The number of farmers implementing sustainable land management technologies and practices ▪ The area of agricultural land managed using sustainable management practices	33,1 thousands ha	78 – 235 thousands lei per fermer	▪ State budget, external funds. ▪ Programs of the Agency for the Development and Modernization of Agriculture (ADMA): Project to Provide Farmers with Fertilizers; Project for the Installment Purchase of Equipment for Renewable Energy Production; Project on Digital Transformation in Agriculture; Project on the Modernization of Agricultural Technology and Equipment (MAME) ▪ Projects of the LEADER National Rural Development Network: A

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					More Sustainable LEADER Ecosystem in the Republic of Moldova; LAG Associations for Resilience and Security
3.3	Implementation of measures for the sustainable management of soil resources	▪ Number of hectares where erosion control measures were implemented, ha	33,1 thousands ha	97 thousands lei/ha	▪ State budget, external funds. ▪ Post-investment grant program for Sustainable Land Management (SLM)
	Agricultural ecosystems				
3.4	The practice of crop rotation	▪ Increased agricultural yields; ▪ Preservation of biodiversity; ▪ Reduced pressure from diseases, weeds, and pests	26,5 thousands ha	15-40 thousands lei/ha/year	▪ State budget, external funds. ▪ AIPA: Grant Program for Improving Land Productivity through Sustainable Land Management and Subsidies ▪ ADMA: Assistance Program for Disadvantaged Farmers 2KR and CAP; Project for the Modernization of Agricultural Technology and Equipment (MAME); Small-Scale Irrigation System Development Program (PDSISM)
3.5	Performing vertical soil loosening without soil inversion	▪ Increasing the organic matter content of the soil; ▪ Carbon sequestration; ▪ Enhancing soil biological activity; ▪ Increasing soil fertility	4,6 thousands ha	1,4 – 2,6 thousands lei/ha	▪ State budget, external funds. ▪ Grants for land improvement works (AIPA) ▪ Project for the Modernization of Agricultural Technology and Equipment (MAME) ▪ Project to Provide Farmers with Fertilizers ▪ Project for the sale and purchase of renewable energy production equipment on an installment basis
3.6	Mitigation of soil compaction by reducing the number of passes and performing field operations at optimal soil moisture	▪ Increasing the organic matter content of the soil; ▪ Carbon sequestration; ▪ Enhancing biological activity and soil fertility	132 ha	17– 28,6 thousands lei/ha	▪ State budget, external funds. ▪ Grant program for sustainable land management ▪ Subsidies for soil improvement projects (AIPA)
3.7	Terracing of sloping land to retain water on slopes	▪ Increased soil moisture and other physical and chemical properties of the soil	1,3 thousands ha	20 – 30 thousands lei/ha	▪ State budget, external funds ▪ Grant program for sustainable land management

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					▪ Subsidies for land improvements
3.8	Establishment of annual cover crops (green manure crops)	▪ Reduction of land degradation under the impact of climate conditions" ▪ Increase in the amount of organic matter accumulated in the soil	26,5 thousands ha	3,3 thousands lei/ha	▪ State budget, external funds ▪ National Rural Development Program (PNDR) ▪ Grant Program for Sustainable Land Management (AIPA)
3.9	Implementation of double seeding	▪ Reducing the volume of surface runoff	662 ha	24 – 43 thousands lei/ha	▪ State budget, external funds ▪ National Rural Development Program (PNDR) ▪ Grant Program for Sustainable Land Management (AIPA)
3.10	Expansion of the conservation agriculture system	▪ Minimal soil disturbance	3,3 thousands i ha	3,6 – 6,7 thousands lei/ha	▪ State budget, external funds ▪ Project to Provide Farmers with Fertilizers ▪ 2KR Installment Sales Program for High-Yield Irrigated Agriculture
	Hydrological measures				
3.11	Implementation of measures for integrated water resources management	▪ Area of irrigated agricultural land (ha) ▪ Percentage of the population with access to safe, high-quality drinking water	3,3 thousands ha	43–89 thousand lei/ha (for initial implementation + one year of operation)	▪ State budget, external funds, public-private partnerships ▪ National Rural Development Program (PNDR) ▪ The "Water Supply and Sanitation Security in Moldova" project is funded by AID and ADA.
3.12	Choosing the optimal irrigation technology	▪ Reducing water losses; ▪ Improving irrigation water use efficiency ▪ Irrigated land area (hectares)	3,3 thousands ha	for drip irrigation (first year): 9,500–18,000 lei/ha for sprinkler irrigation (first year): 7,500–15,000 lei/ha	▪ State budget, external funds, public-private partnerships ▪ Small-Scale Irrigation System Development Program (PDSISM) ▪ Grants provided by UCIP IFAD ▪ Agricultural Intervention and Payments Agency (AIPA) ▪ "Capacity Building for Rural Transformation (TRTP)" Project
3.13	Measures to mitigate water erosion	▪ Reducing soil loss due to surface erosion	3,3 thousands ha	23 – 44 thousands lei/ha	▪ State budget, external funds ▪ Grants for investment projects aimed at improving soil quality ▪ The "Capacity Building for Rural Transformation"

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					(TRTP) project
3.14	Mitigation measures to improve lateral connectivity and water retention capacity in the floodplain	▪ Flood prevention through the retention of flood waves in restored floodplains." ▪ Increase in biodiversity; improvement of the microclimate	3,3 thousands ha	2.050 – 4.100 thousands lei/ha	▪ State budget, external funds ▪ Rehabilitation of hydrotechnical infrastructure to mitigate vulnerability to climate change-induced extreme events in the Republic of Moldova (UNDP) ▪ The "Capacity Building for Rural Transformation" (TRTP) Program
3.15	Construction of compensation reservoirs	▪ Increasing the amount of water available for combating desertification	1,9 thousands ha	28 – 45 thousands lei/ha	▪ State budget, external funds ▪ Rehabilitation of hydrotechnical infrastructure to mitigate vulnerability to climate change-induced extreme events in the Republic of Moldova (UNDP) ▪ Small-Scale Irrigation System Development Program (PDSISM) ▪ Grants provided by UCIP IFAD ▪ The "Capacity Building for Rural Transformation (TRTP)" Project
3.16	Creating new wetlands	▪ Improvement of the microclimate; ▪ Biodiversity; ▪ Flood protection.	1,9 thousands ha	60 – 130 thousands lei/ha annually	▪ State budget, external funds ▪ National Rural Development Program (PNDR) ▪ Rehabilitation of Hydrotechnical Infrastructure to Mitigate Vulnerability to Extreme Events Caused by Climate Change in the Republic of Moldova (UNDP) ▪ "Capacity Building for Rural Transformation (TRTP)" Project
3.17	Establishment of buffer zones along rivers and canals	▪ Retention of soil particles; ▪ Prevention of eutrophication; ▪ Biomass production.	66 ha	55 thousands lei/ha	▪ State budget, external funds ▪ National Rural Development Program (PNDR) ▪ Rehabilitation of hydrotechnical infrastructure to mitigate vulnerability to extreme weather events caused by climate change in the Republic of Moldova (UNDP) ▪ "Capacity Building for

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					Rural Transformation (TRTP)" Project ▪ "Solid Waste in the Republic of Moldova" Project ▪ UNEP/GEF Project: Global Biodiversity Framework ▪ UNEP/GEF Project: Biosafety Implementation Framework for the Management of Biological Resources in Moldova
3.18	**The rehabilitation of existing irrigation systems and the introduction of new irrigation systems**	▪ Total area irrigated annually	1,9 thousands ha	for drip irrigation systems: 33,000 lei/ha for sprinkler irrigation systems: 51,500 lei/ha	▪ State budget, external funds ▪ National Rural Development Program (PNDR) ▪ Rehabilitation of Hydrotechnical Infrastructure to Mitigate Vulnerability to Extreme Weather Events Caused by Climate Change in the Republic of Moldova (UNDP) ▪ Small-Scale Irrigation System Development Program (PDSISM) ▪ Agency for Intervention and Payments in Agriculture (AIPA)
SPECIFIC OBJECTIVE 4. REMEDIATION OF SITES CONTAMINATED WITH ORGANIC POLLUTANTS PREVENTION OF NEW ACCUMULATIONS OF PESTICIDES AND HAZARDOUS CHEMICALS					
4.1	**Identification of sites contaminated with organic pollutants in the pilot area**	▪ Number of contaminated sites identified	32 localități	105 – 195 thousands lei/location	▪ State budget, external funds, public-private partnerships. ▪ Global Environment Facility Small Grants Programme (GEF SGP) (UNDP) ▪ Small and Medium-sized Enterprise Greening Programme (ECO SME) (ODA) ▪ EU4Environment (European Union) ▪ National Waste Management Program for 2023–2027
4.2	**Development of the remediation plan**	▪ Development and approval of a remediation plan for sites contaminated with persistent organic pollutants (POPs)	32 localități	970 thousands lei – 1.500 thousands lei/location	▪ State budget, external funds, public-private partnerships. ▪ Global Environment Facility Small Grants

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
					Programme (GEF SGP) (UNDP) ▪ Small and Medium-sized Enterprise Greening Programme (ECO SME) (ODA) ▪ EU4Environment (European Union) ▪ National Waste Management Program for 2023–2027
SPECIFIC OBJECTIVE 5. SOCIAL MEASURES: PUBLIC INFORMATION, AWARENESS, AND ENVIRONMENTAL EDUCATION					
5.1	Mapping environmental risks in the pilot area	▪ Phenomena modeled based on data and information provided or acquired from specialized institutions. ▪ Methodology for assessing and mapping natural hazards and risks in the pilot area, developed and approved. ▪ Atlas of natural hazard and risk maps at different scales (at commune level), supported by an environmental assessment, developed and presented to local public authorities.	1 zonă pilot	930 thousands lei/ pilot area	▪ State budget, external funds ▪ GEF WATER MAP Project ▪ Project "Integrating adaptation into the planning process to reduce vulnerability to climate change at the local and national levels in the agricultural sector of the Republic of Moldova" (AgSap) FAO (GEF8)
5.2	Supplying local water needs from groundwater sources	▪ Number of wells constructed ▪ Number of groundwater users	33,6 thousands beneficiaries	190 lei/beneficiary	▪ State budget, external funds, public-private partnerships ▪ The "Improvement of Water Infrastructure in Central Moldova" Project ▪ The Groundwater Resources Protection Project (UNDP)
5.3	Training courses for farmers on soil protection and improvement	▪ Number of farmers trained	160 fermers	1.000 lei/fermer	▪ State Budget ▪ National Rural Development Program (PNDR)
5.4	Environmental education initiatives and public awareness campaigns on sustainable methods and techniques for land use and soil quality improvement	▪ Number of guides developed/distributed on crop rotation; best practices in soil loosening; guidelines for green manure crops; ▪ 10 large-scale campaigns organized and implemented at the local level (two per year); ▪ 5 field leaders and 5 other officials from the	1 action	20-50 thousands lei	▪ State budget, external funds, public-private partnerships ▪ National Rural Development Program (PNDR) ▪ Grant Program for Sustainable Land Management (MDT) ▪ Project "Integrating adaptation into the

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
		pilot local authorities trained on the strategy's objectives and the LDN concept			planning process to reduce vulnerability to climate change at the local and central levels in the agricultural sector of the Republic of Moldova" (AgSap) FAO (GEF8)
5.5	**Operational analysis of environmental monitoring networks, with conclusions and recommendations regarding the expansion of environmental quality monitoring stations**	▪ Study on the coverage of the pilot area with environmental and hydrometeorological monitoring systems, prepared based on an analysis of the environmental conditions in the pilot area	1 study	190,5 thousands lei	▪ State budget, external funds, public-private partnerships ▪ National Environmental Fund ▪ LIFE Project ▪ UNEP/GEF Project: Global Biodiversity Framework – Early Action Support Project. ▪ Project "Conservation and sustainable management of wetlands with a focus on areas of high natural value in the Prut River basin" ▪ The project "Integrating adaptation into the planning process to reduce vulnerability to climate change at the local and central levels in the agricultural sector of the Republic of Moldova" (AgSap) FAO (GEF8)
5.6	**Continuous monitoring of environmental quality and conditions in the pilot area**	▪ Environmental quality and condition monitoring systems ▪ An automated monitoring system installed and operational; ▪ Periodic agrometeorological and soil quality data and reports prepared and distributed to users; ▪ Periodic data and specialized information on environmental quality and the dispersion of pollutants in the environment	1 pilot area	Initial cost (equipment, infrastructure, software): 400,000–1,300,000 lei. Annual operating and maintenance costs: 25,000–65,000 lei/year	▪ State budget, external funds ▪ SHS, through the following projects: "Strengthening Disaster Risk Management and Resilience in the Republic of Moldova" – budget support provided by the World Bank; "Enhancing Human Security through Agri-Food Resilience," funded by the Green Climate Fund Project; "Rehabilitation of Hydrotechnical Infrastructure," funded by the Austrian Development Agency.
5.7	**Providing decision-makers in the pilot area with access to environmental monitoring systems and supplying them with necessary hydrometeorological data and information on air, water, and soil**	▪ The number of cadastral engineers in the area who have access to environmental monitoring systems. ▪ Local landowner leaders equipped with data storage devices and trained to access environmental	1 pilot area	164 thousands lei/year	▪ State budget, external funds ▪ The European Union's LIFE Program ▪ The Romania–Moldova Cross-Border Cooperation Program 2021–2027 ▪ The "Improving Water

	Actions	Progress indicator	The target to be achieved by 2030	Estimated cost	Sources of funding
	quality, etc.	databases			Resource Management in Moldova" Project (Moldova Water Project)
5.8	Encouraging and guiding large farmers' associations and local government authorities in the pilot area to establish and manage their own observation posts in accordance with Law No. 368/2023	▪ A dedicated agrometeorological observation network installed on the lands of the largest agricultural holdings. ▪ Observational data integrated into the national system, processed, and applied in farmers' activities.	2 observation posts	500 thousands lei/observation post	▪ State budget, external funds ▪ National Hydrometeorological Data Fund ▪ Project: "Integrating adaptation into the planning process to reduce vulnerability to climate change at the local and national levels in the agricultural sector of the Republic of Moldova" (AgSap) FAO (GEF8)

CHAPTER VI. IMPLEMENTATION RISKS

As a long-term planning document, the Strategy will focus on promoting cost-intensive actions aligned with the commitments undertaken under the UNCCD Convention. During the implementation process, multiple risks will be assessed and monitored, which may affect both the implementation of the proposed interventions and the achievement of the intended objectives and results, with appropriate mitigation measures applied.

The following types of risks are the most imminent:

Risk type	Risk Level	Mitigation measures
	Institutional risks	
Insufficient and unstable human resources in the secto	High	The attractiveness of employment in the environmental and agricultural sectors is low due to insufficient remuneration for staff, particularly in forestry and within Local Public Administrations (e.g. cadastral engineers). This leads to high staff turnover, which requires continuous training. The LDN Strategy addresses this risk through instruments aimed at incentivizing the recruitment of qualified personnel. The planned review and update of the organizational and functional structure of institutions under the Ministry of Environment and the Ministry of Agriculture and Food Industry, as part of the institutional reform, will improve institutional efficiency. Emphasis will be placed on strengthening collaboration with institutions under both ministries (in particular, the Meteorology and Environmental Monitoring Authority and the Agency for Geodesy, Cartography and Cadastre), as well as with educational and research institutions, in order to integrate new curricula, enhance technical equipment for study and research, and increase the number of publicly funded places in agricultural and environmental specializations.
Political instability and shifts in priorities due to external factors	Medium	The specific objectives included in the LDN Strategy are aligned with the regional context. Political uncertainty often leads to frequent changes in decision-makers and systemic restructuring of local and district public authorities and institutions. This may result in delays in the implementation of the Strategy. The impact of political instability can be mitigated through the continuation of FAO-funded projects, which will further strengthen efforts towards achieving this pathway.
	Administrative and financial risks	
Limited financial and technical capacity	High	The financial resources required to implement the Strategy are the main obstacle to achieving the expected results and impact. Implementing the measures included in the Strategy requires significant financial resources, particularly for those involving technical interventions in erosion control measures, etc. Part of these expenses is already provided for in the budget framework (the National Forest Expansion and Rehabilitation Program for 2023–2032 and the Land Improvement Program to Ensure Sustainable Soil Resource Management for 2021–2025). At the same time, through donors and international financial institutions, part of the necessary funds can be secured in the form of grants or preferential loans from development partners.
Environmental economic	Medium	New agricultural and environmental economic instruments, such as **agricultural insurance**, provide farmers with the opportunity to insure

instruments are not fully developed		against risks including severe drought, hail, frost, floods, and heavy rainfall. Unfortunately, this legislation is only at an early stage of implementation, and many farmers are still unaware of these benefits..
Insufficient cooperation between central and local public authorities	Medium	The objectives set by the Strategy need to be primarily assumed by key actors at the local level (Local Public Authorities and farmers) and implemented through local action plans. The implementation of the Strategy's provisions will be successful only if effective collaboration exists between central and local public authorities in carrying out the planned actions. To mitigate the risks that may arise in this regard, measures may include the establishment of dialogue platforms with Local Public Authorities, such as sectoral working groups on decentralization, as well as local, regional, and national coordination mechanisms, financial, material, methodological and informational support, training sessions and workshops, and public consultations on various projects. These measures are intended to promote the implementation of local action plans, guide actions aimed at improving the condition of land resources, and facilitate the allocation of financial resources necessary for implementation at the local level.
The lack of interest on the part of central government authorities in integrating environmental protection and climate change priorities into the policies promoted in the agricultural sector.	Medium	The implementation of certain objectives set out in the Strategy requires ownership by the key actor at the national level (the Ministry of Agriculture and Food Industry) and their integration into sectoral policies. Assuming responsibility for advancing the national vision on soil protection and climate change adaptation in the agricultural sector represents a key factor for the successful implementation of this document. To mitigate risks that may arise from responsible authorities, it is necessary to ensure methodological and informational support, as well as strengthened national coordination for the institutions involved, in order to enhance their capacity and motivation to translate this vision into practice, including into green investment documents in agriculture. A more systematic application of Strategic Environmental Assessment (SEA) to policy and planning documents will further support this process.
External risks		
The unfavorable geopolitical situation may be a factor in the ineffectiveness of the measures implemented	High	The war in Ukraine and the energy crisis have a direct impact on the environment of the Republic of Moldova. In addition to the transboundary effects of pollution, the energy crisis has also led to increased logging, thereby reducing forest areas. This situation may pose significant risks to the effective achievement of the LDN objectives, including reducing land degradation and expanding forest cover. Establishing a technical assistance fund from development partners, dedicated to supporting the Republic of Moldova—including environmental challenges arising from the consequences of the war—would represent a viable solution to mitigate this risk.

CHAPTER VII. RESPONSIBLE INSTITUTIONS

The LDN Strategy will be endorsed by the UNCCD Secretariat, which will monitor and evaluate its implementation through FAO, as well as the Orhei and Rezina District Councils.

The implementation of the Strategy will involve, in accordance with institutional responsibilities, the district councils (Orhei and Rezina) and the 32 local public administrations.

The implementation of the Strategy will be ensured through several sectoral programmes, including: the National Programme for Forest Expansion and Rehabilitation for 2023–2032, the National Climate Change Adaptation Programme until 2030, the Environmental Strategy for 2024–2030, and the National Agricultural and Rural Development Strategy 2023–2030. It will also rely on programmes currently under implementation or to be developed and approved, such as: the Strategic Programme of Agricultural Policy for 2026–2030, the National Disaster Risk Reduction Programme until 2030, the Biodiversity Programme for 2026–2030, and the National Programme for Combating Desertification and Land Degradation for 2026–2030.

In the context of achieving Land Degradation Neutrality (LDN) in the Republic of Moldova, the LDN Working Group, to be established under FAO coordination, will play a strategic role in the implementation and monitoring of LDN targets. This group will bring together expertise from key institutions, government agencies, researchers, and other stakeholders, facilitating inter-institutional collaboration and guiding policies and measures aimed at protecting and restoring degraded land.

Role of the LDN Working Group:

- The Group will coordinate land restoration initiatives, ensuring that implemented measures are aligned with LDN targets.
- It will develop and apply methods for monitoring progress towards LDN objectives, ensuring transparency and periodic reporting.
- The Group will facilitate the exchange of expertise and provide technical assistance for the application of best practices in land restoration and management.

As the Focal Point, the State Hydrometeorological Service (SHS) will be responsible for centralizing information and coordinating measures for the protection of soils and water resources. SHS will act as an intermediary between local authorities, the Working Group, and international bodies, contributing to the application of standards for land and natural resource quality.

Alongside SHS, other institutions and organizations (ministries, environmental agencies, NGOs, and local communities) will contribute to the implementation of LDN objectives, ensuring access to necessary resources and the integration of multisectoral approaches for sustainable land management.

Thus, the LDN Working Group, together with SHS and national partners, will facilitate progress towards achieving LDN targets through effective coordination and the implementation of concrete measures for land protection and restoration, in line with the national and international environmental framework..

CHAPTER VIII. MONITORING AND REPORTING PROCEDURES

Measures for achieving LDN are most effective when they are planned in an integrated manner, taking into account the different types of land within the landscape. The neutrality mechanism should be implemented at a natural spatial scale (e.g., watershed or landscape) or an administrative scale (e.g., municipality) of land-use planning and decision-making, and should be scalable so that results can be reported at the national level.

Ideally, neutrality should be integrated into existing land-use planning processes and implemented by existing institutions. In many cases, this will translate into comprehensive national strategies that include complementary activities. These may include the adoption of sustainable land management practices, the restoration of degraded land for production, as well as the restoration of natural and semi-natural ecosystems that provide valuable functions and benefits.

The overall impact pathway or theory of change for achieving LDN begins with assessing and strengthening the enabling environment for LDN, namely the institutions, policies, legal frameworks, and capacities that need to be in place across all sectors to support LDN implementation. An integrated landscape-scale approach, aimed at reconciling multiple objectives such as sustainable agricultural productivity, ecosystem conservation, and livelihoods, can only be achieved through cross-sectoral collaboration, the promotion and management of trade-offs, and the engagement of multiple stakeholders.

It is assumed that, through the implementation of this Strategy, land degradation in the pilot area will be avoided, reduced, or reversed, thereby enabling progress towards Land Degradation Neutrality (SDG Target 15.3). Consequently, these changes are expected to ultimately impact the proportion of degraded land within the total land area (SDG Indicator 15.3.1). To assess this indicator, UNCCD recommends calculating three sub-indicators of state change: (1) trends in land cover, (2) trends in land productivity or land function, and (3) trends in carbon stocks in vegetation and soil.

It is important to capitalize on all efforts undertaken to achieve LDN, as over time these additional indicators can contribute to a change in land condition, while also helping to reverse, avoid, and reduce land degradation.

There is continuous development of tools to improve monitoring information, actions, and indicators across multiple scales (from household level to local, district, and national public authorities) in order to achieve a better understanding of this process.

In the Republic of Moldova, the monitoring process of the Strategy involves the development of a tool for collecting and analyzing aggregated data on the actual condition of land resources, which will allow the evaluation of the results of implemented interventions against the expected outcomes.

Monitoring the implementation of the objectives and action directions included in the Strategy involves the collection and centralization of information from local public authorities regarding the established outcome indicators, as well as information obtained through the annual reporting process (land cadastre data, including forest area and protective forest belts, and soil quality).

The monitoring and reporting of the Strategy's implementation will be ensured by the 32 Local Public Authorities (LPAs).

The annual monitoring reports will be subject to public consultation and will be published on the official websites of the district councils and LPAs.

ANNEXES

ANNEX 1.

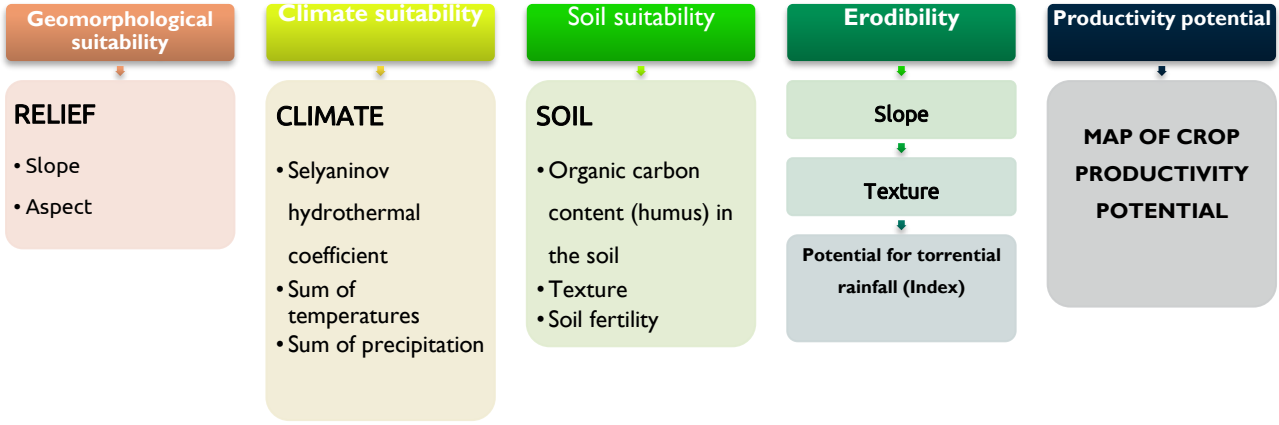
Figure 1.1. Area of eroded land, by municipality, as of January 1, 2024[12]

No.	Name of administrative-territorial units	Total land, ha	Of which agricultural land, ha	Weighted average fertility score, points	Eroded land			
					Total	Including:		
						Slight	Moderate	High
	Şoldăneşti District							
1.	Răspopeni	3104	2191	58	**1363**	834	401	128
	Rezina District							
2.	Bușăuca	2241	1777	55	**1347**	713	524	110
3.	Cogâlniceni	1462	765	66	**453**	221	137	95
4.	Cuizăuca	2453	1760	65	**873**	556	232	85
5.	Ghiduleni	2640	2012	53	**1705**	831	655	219
6.	Gordinești	1653	1284	58	**901**	489	336	76
7.	Ignăței	3551	2929	67	**1623**	748	540	335
8.	Otac	1309	916	60	**620**	352	195	73
9.	Peciște	2716	1999	73	**1146**	609	419	118
10.	Pereni	1250	960	54	**784**	400	248	136
11.	Pripiceni-Răzeși	2035	1547	70	**754**	526	192	36
12.	Trifești	1294	748	50	**707**	298	277	132
	Orhei District							
13.	Berezloci	2853	2447	65	**1149**	773	256	120
14.	Bieşti	4748	3942	70	**2430**	1772	515	143
15.	Bolohan	2418	1893	58	**1343**	898	379	66
16.	Bulăieşti	2756	1661	76	**842**	577	191	74
17.	Chiperceni	5249	4081	66	**2818**	1707	920	191
18.	Crihana	2477	1819	60	**1095**	676	314	105
19.	Cucuruzeni	3743	3124	58	**2096**	1226	499	371
20.	Ivancea	7255	3376	70	**1590**	1247	278	65
21.	Jora de Mijloc	4778	3400	64	**1534**	1022	334	178
22.	Mârzeşti	2160	1845	77	**859**	614	91	154
23.	Piatra	2951	2045	61	**1173**	714	384	75
24.	Podgoreni	2074	1546	58	**1045**	522	402	121
25.	Pohorniceni	3149	1610	79	**468**	338	121	9
26.	Pohrebeni	4643	2829	74	**1645**	925	594	126
27.	Step-Soci	2567	2068	58	**1162**	639	339	184
28.	Susleni	4943	4014	76	**2026**	1798	156	72
29.	Trebujeni	4003	2182	81	**643**	351	128	164
30.	Vâşcăuți	2609	980	78	**326**	240	61	25
31.	Zahoreni	2575	1960	55	**1520**	809	565	146
32.	Zorile	1650	1340	63	**800**	511	214	75

[12] Conform anexei 4 din https://dataset.gov.md/dataset/cadastrul-funciar-2024

ANNEX 2.

Figure 2.2. Methodology for Assessing Land Productivity Potential [13]

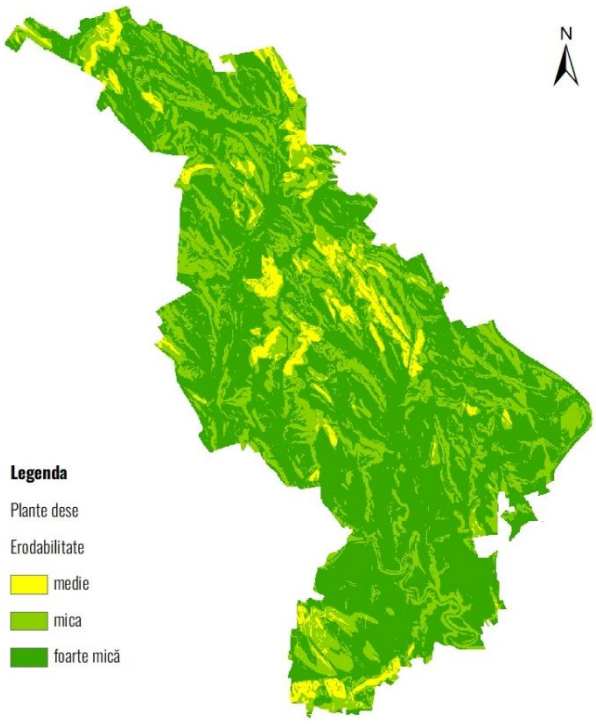


[13] Makubi, R. M. (2024). Assessment and Quantification of Land Productivity Potential in Kilindi District. *African Journal on Land Policy and Geospatial Sciences*, *7*(5), 1484–1503. https://doi.org/10.48346/IMIST.PRSM/ajlp-gs.v7i5.49708 (pag. 1490 / 7)
[13] Bernard, B.; Mwanjalolo, M.J.G.; Moses, B.; James, K.; Paul, M.; Ojoatre, S.; Lydia,W.;Walusimbi, M.N. A Simplified Spatial Methodology for Assessing Land Productivity Status in Africa. Land **2022**, 11, 730. https://doi.org/10.3390/land11050730 , pag. 6 din 19)

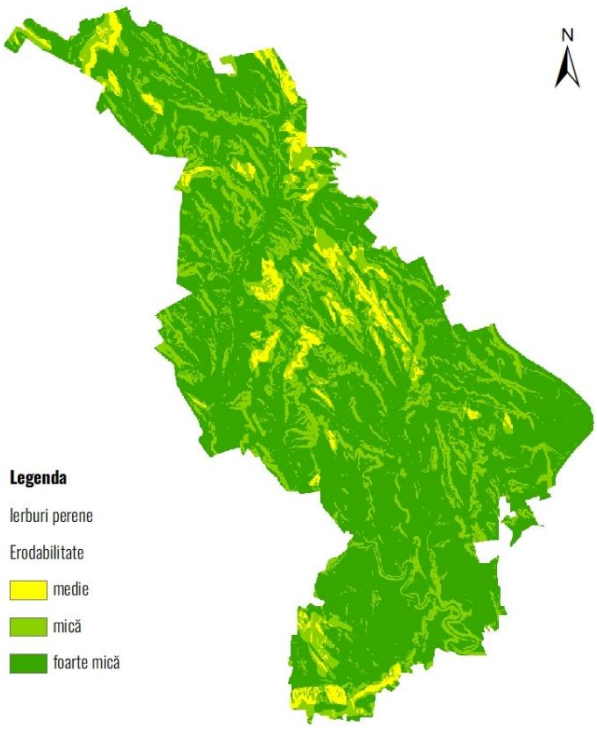
ANNEX 3.

Erosion potential

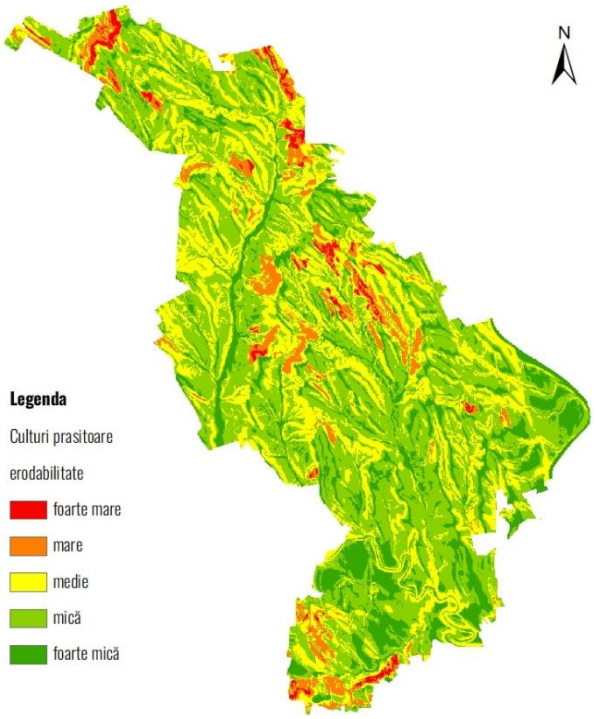
Data on **slope gradient** and **soil texture** were used for this indicator. The potential for rain erosion (Fournier Index) was also analyzed; however, since it does not vary significantly within the region (perhaps due to the lack of weather stations), it was excluded.



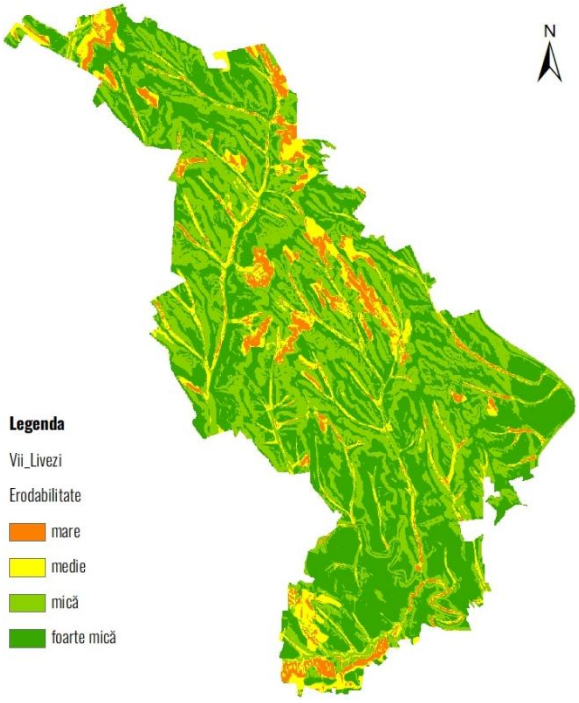
a) Compact crops



b) Perennial crops



c) Row crops



d) Perennial crops

Figure 3. 1. Erosion potential for different crop categories

It can be observed that compact crops (winter wheat, soybean, and winter barley) and perennial crops (alfalfa and sainfoin) (Fig. 3a and 3b) generally exhibit a very low susceptibility to erosion. Only on slopes exceeding 10 degrees does this susceptibility reach moderate levels. Row crops (maize and sunflower) show a moderate susceptibility even on slopes starting from 7 degrees, which becomes high on slopes above 10 degrees (Fig. 3c). Perennial plantations (Fig. 3d) display a moderate susceptibility (lower than that of row crops), provided that inter-row grass cover is maintained. A high susceptibility to erosion for this group of crops occurs on slopes greater than 7 degrees, particularly on soils with sandy loam or loamy sand textures.

Table 3. 1. Soil erodibility

Degree of erodibility	Dense crops	Perennial grasses	Row crops	Perennial plantations
very small	62,7	71,1	15,9	44,6
small	31,2	24,2	46,9	39,1
medium	6,0	4,7	29,6	9,9
large	0,0	0,0	6,1	6,4
very large	0,0	0,0	1,5	0,0
	100,0	100,0	100.00	100,0

ANNEX 4.

Agroclimatic conditions

To determine the degree of aridity in the study area, the **Selyaninov Hydrothermal Coefficient** was used:

CHT = R / (0.1 * ΣT), where:

- R – total precipitation (mm) during the period with temperatures above +10°C
- ΣT – sum of temperatures for the same period, with temperatures above +10°C
    - HTC < 0.5 → severe drought;
    - HTC = 0.5–1.0 → moderate drought;
    - HTC = 1.0–1.5 → normal conditions;
    - HTC > 1.5 → excess moisture.

Thus, in the pilot area, two categories of zones can be identified – moderate drought and normal conditions (Fig. 4.1). The areas with normal conditions, located in the central and northern part of the region (with sufficient precipitation), where all crops develop well, were assigned the maximum value of 5. In areas experiencing moderate drought (the southern part of the region and lowland floodplain areas, with lower altitudes and insufficient precipitation), row crops and cereals may face difficulties in spike formation or pollination (score 3), while perennial grasses and vineyards tolerate drought (scores 4 and 5, respectively).

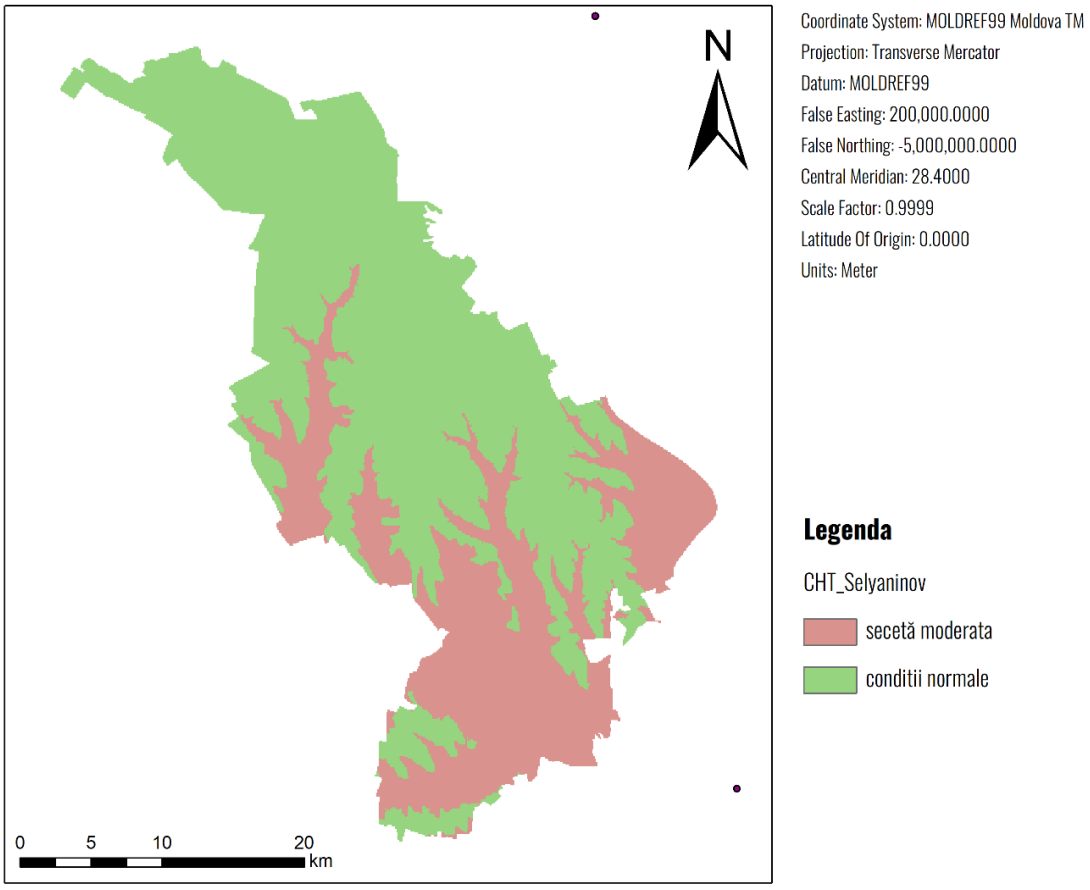


Figure 4. 1. Selyaninov's hydrothermal coefficient

For the assessment of the climatic suitability of crops, four indicators were analyzed: the Selyaninov Hydrothermal Coefficient, the sum of active temperatures, the annual precipitation total, and the precipitation during the vegetation period. Given that these requirements vary significantly among different crops, only the final maps of climatic suitability by crop categories will be presented (Fig. 4.2–4.5). Below are presented the agro-climatic requirements for the main crops and the cumulative scores based on the climatic conditions recorded during the 1991–2020 period (Tables 4.1–4.9)[14], [15], [16].

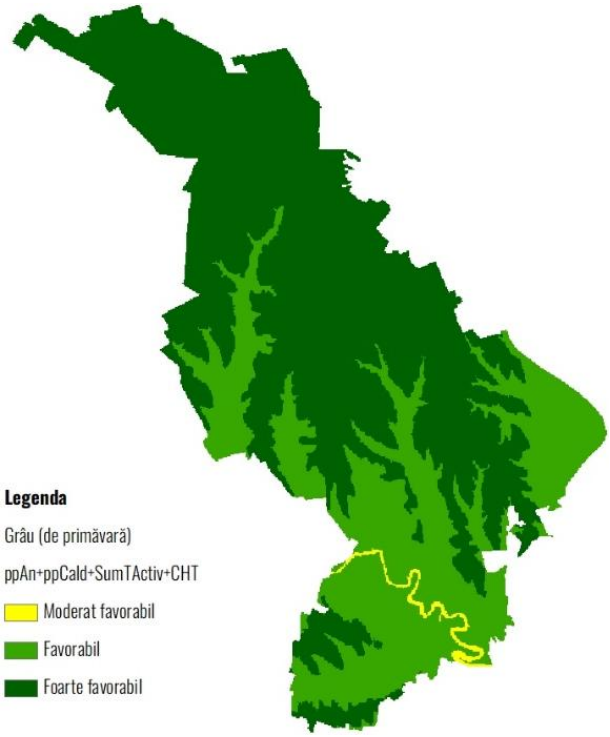
Table 4. 1 Agroclimatic conditions for wheat cultivation

Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Wheat	450 - 600	5	200 - 300	5	1700 - 1900	5	0,8 – 1,0	5
	350 - 450	3	150 - 200	3	1500 - 1700	3	0,6 – 0,8	3
	< 350	1	< 150	1	1300 - 1500	1	< 0,6	1

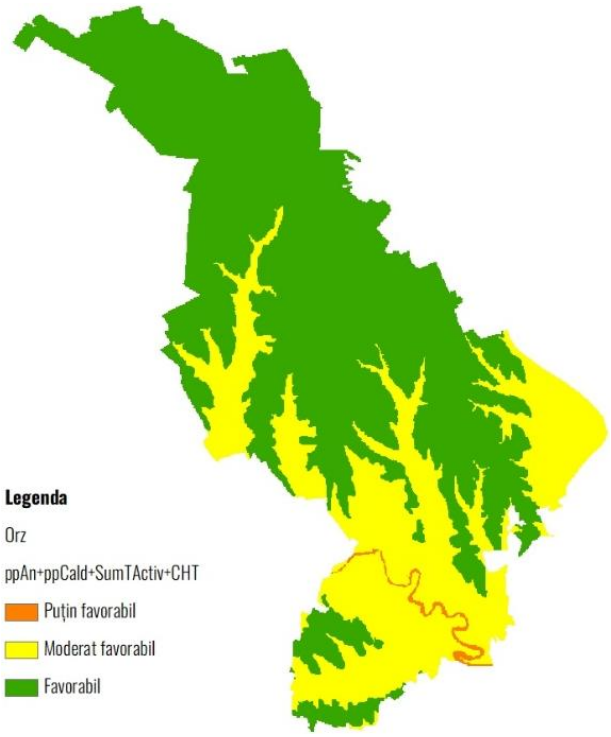
Table 4. 2 Agroclimatic conditions for barley cultivation

Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Barley	500 - 600	5	> 400	5	1500 - 1700	5	> 1,2	5
	400 - 500	4	300 - 400	3	1400 - 1500	3	0,8 – 1,2	3
	300 - 400	2	< 300	2	1300 - 1400	1	< 0,8	1
	< 300	1						

[14]BEJAN, I., GRIGORAȘ, M., COJOCARI, R., et al. Ghid climatic al Republicii Moldova. Ediție științifico-aplicativă. Date pe termen lung. Chișinău, 2024, 190 pag.
[15] https://www.meteo.md/images/uploads/pages_galleries/poster_precipitatii_1991_2020.png
[16] https://www.meteo.md/images/uploads/pages_galleries/poster_temperatura_medie.png

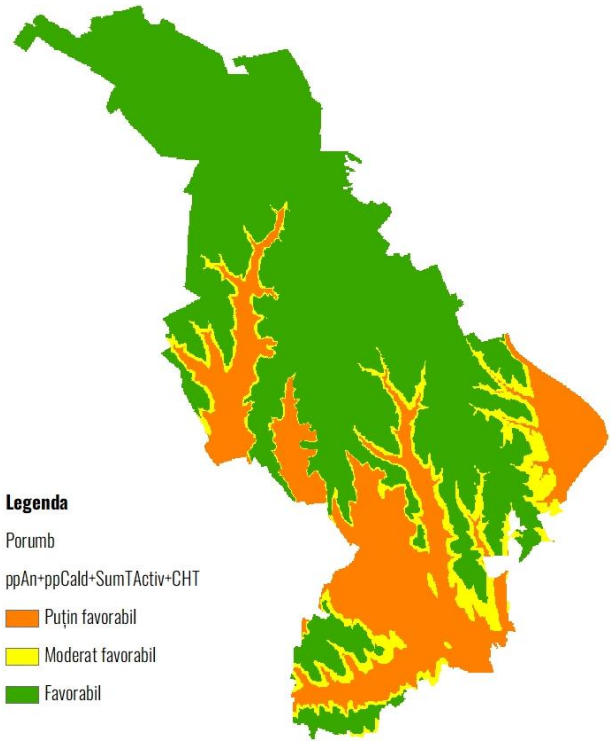


a) *Wheat*

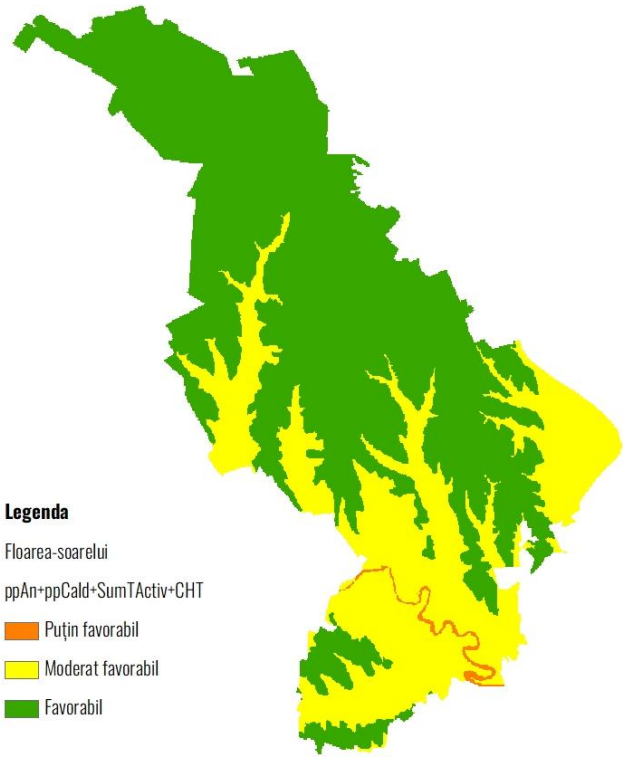


b) *Barley*

Figure 4. 2 The climatic suitability of compact crops



c) *Corn*



d) *Sun flower*

Figure 4. 3 The climatic suitability of row crops

Table 4. 3. Agroclimatic conditions for corn cultivation

Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Corn	550 - 700	5	> 400	5	2400 - 3000	5	1,0 – 1,2	5
	450 - 550	4	300 - 400	3	2200 - 2400	3	0,8 – 1,0	3
	350 - 450	2	< 300	1	2000 - 2200	1	< 0,8	1
	< 350	1						

Table 4. 4. Agroclimatic conditions for sun flower cultivation

Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Sun flower	501 - 600	5	> 400	5	1600 - 1800	5	1,0 – 1,2	5
	401 - 500	4	300 - 400	3	1500 - 1600	3	0,8 – 1,0	3
	300-400	2	< 300	2	1400 - 1500	1	< 0,8	1
	< 300	1						

Table 4. 5. Agroclimatic conditions for apple cultivation

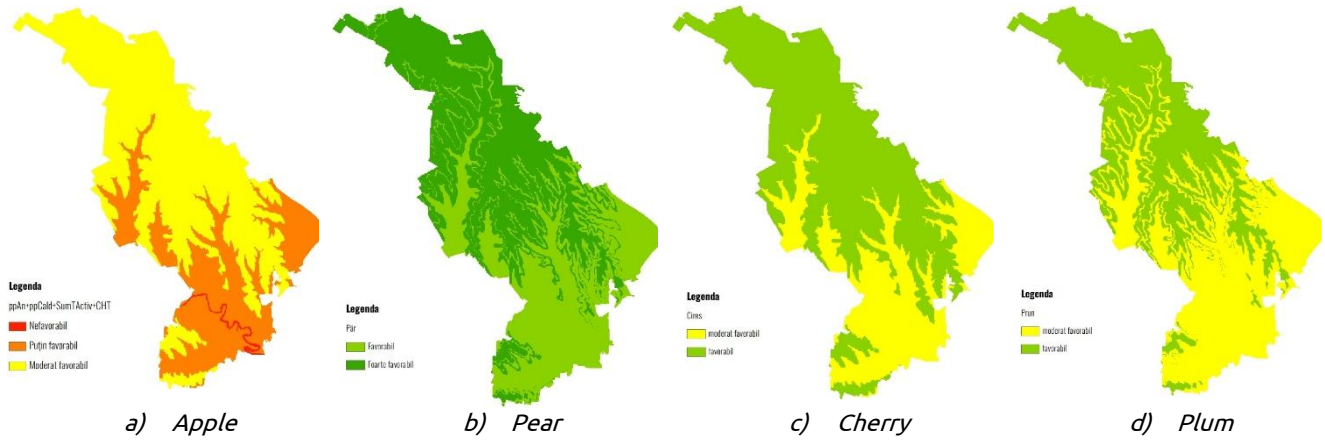
Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Apple	600 - 800	5	> 400	5	1700 - 1900	5	> 1,5	5
	500 - 600	4	300 - 400	3	1500 - 1700	3	1,0 – 1,5	3
	400 - 500	2	< 300	1	1300 - 1500	1	< 1,0	1
	< 400	1						

Table 4. 6. Agroclimatic conditions for cherry cultivation

Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Cherry	500 - 700	5	> 400	5	1800 - 2200	5	> 1,4	5
	400 - 500	4	300 - 400	3	1600 - 1800	3	1,0 – 1,4	3
	300 - 400	2	< 300	1	1400 - 1600	1	< 1,0	1
	< 300	1						

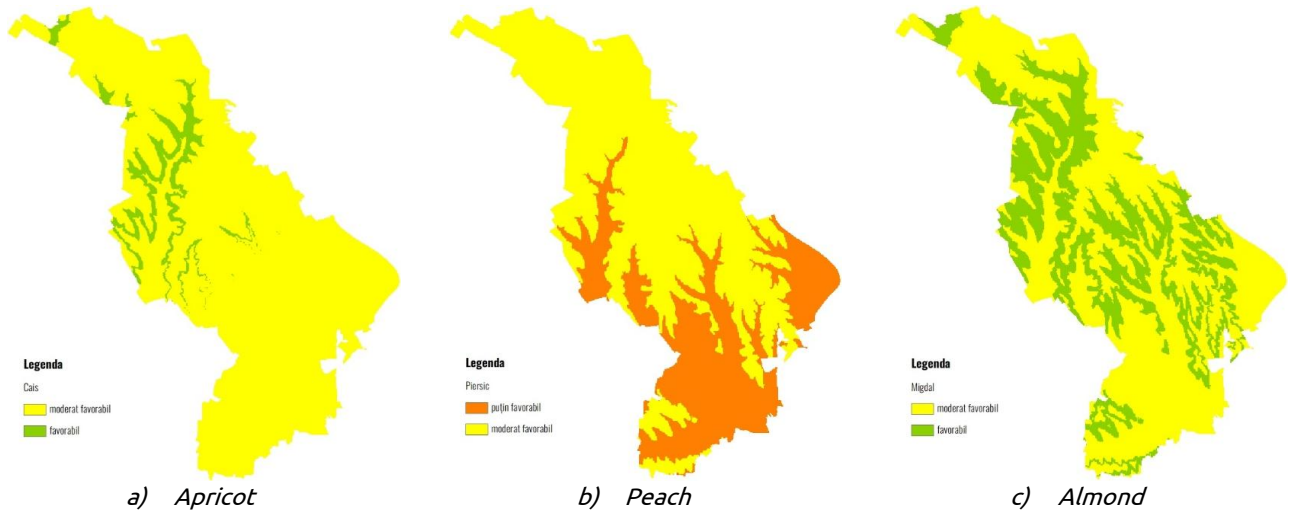
Table 4. 7. Agroclimatic conditions for plum cultivation

Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Plum	500 - 700	5	> 400	5	1800 - 2200	5	> 1.4	5
	400 - 500	4	300 - 400	3	1600 - 1800	3	1.0 - 1.4	3
	300 - 400	2	< 300	1	1400 - 1600	1	< 1.0	1
	< 300	1						



a) Apple *b) Pear* *c) Cherry* *d) Plum*

Figura 4. 4. Climatic suitability of moderate fruit crops



a) Apricot *b) Peach* *c) Almond*

Figure 4. 5. Climatic suitability of thermophilic fruit crops

Table 4. 8. Agroclimatic conditions for apricot cultivation

Crop	Annual precipitation amount (mm)	Precipitation amount during the warm period of the year (mm)	Sum of active temperatures (°C)	Hydrothermal Coefficient

	required	score	required	score	required	score	required	score
Apricot	500 - 700	5	> 400	5	2000 - 2400	5	> 1,6	5
	400 - 500	4	300 - 400	3	1800 - 2000	3	1,2 – 1,6	3
	300 - 400	2	< 300	1	1600 - 1800	1	< 1,2	1
	< 300	1						

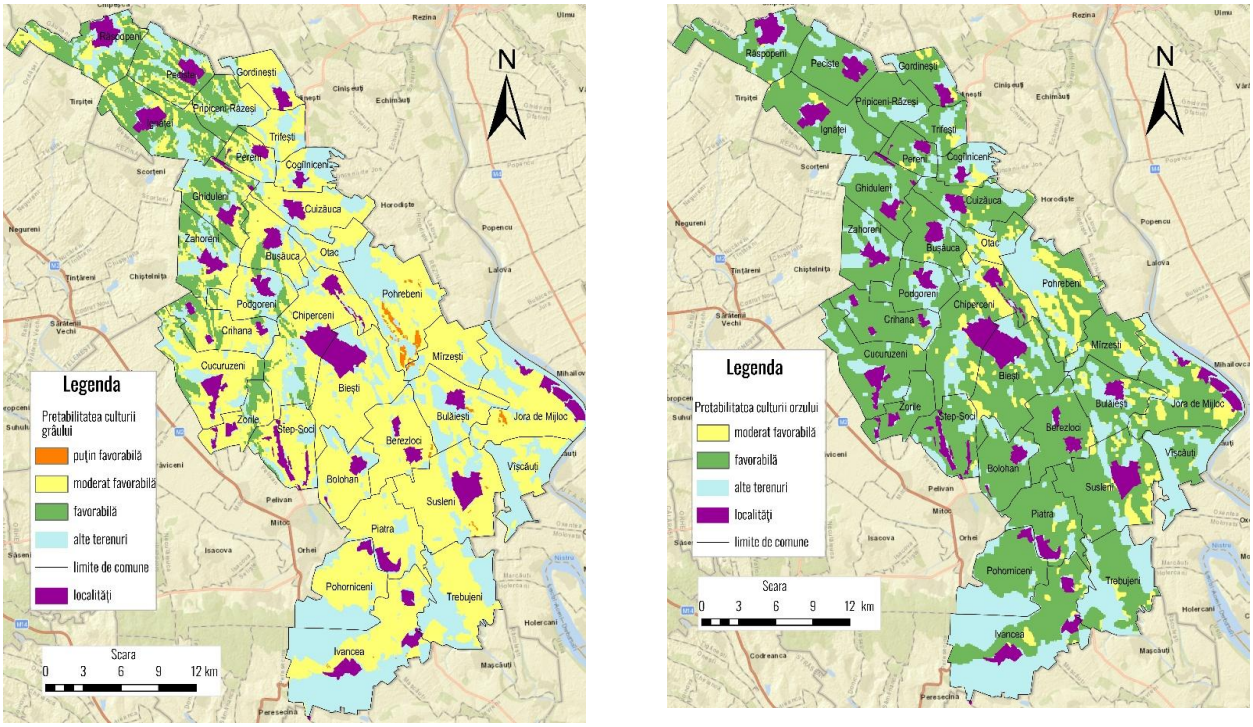
Table 4. 9. Agroclimatic conditions for almond cultivation

Crop	Annual precipitation amount (mm)		Precipitation amount during the warm period of the year (mm)		Sum of active temperatures (°C)		Hydrothermal Coefficient	
	required	score	required	score	required	score	required	score
Almond	400 - 600	5	> 350	5	2400 - 2800	5	> 1,8	5
	300 - 400	4	250 - 350	3	2200 - 2400	3	1,4 – 1,8	3
	200 - 300	2	< 250	1	2000 - 2200	1	< 1,4	1
	< 200	1						

ANNEX 5.

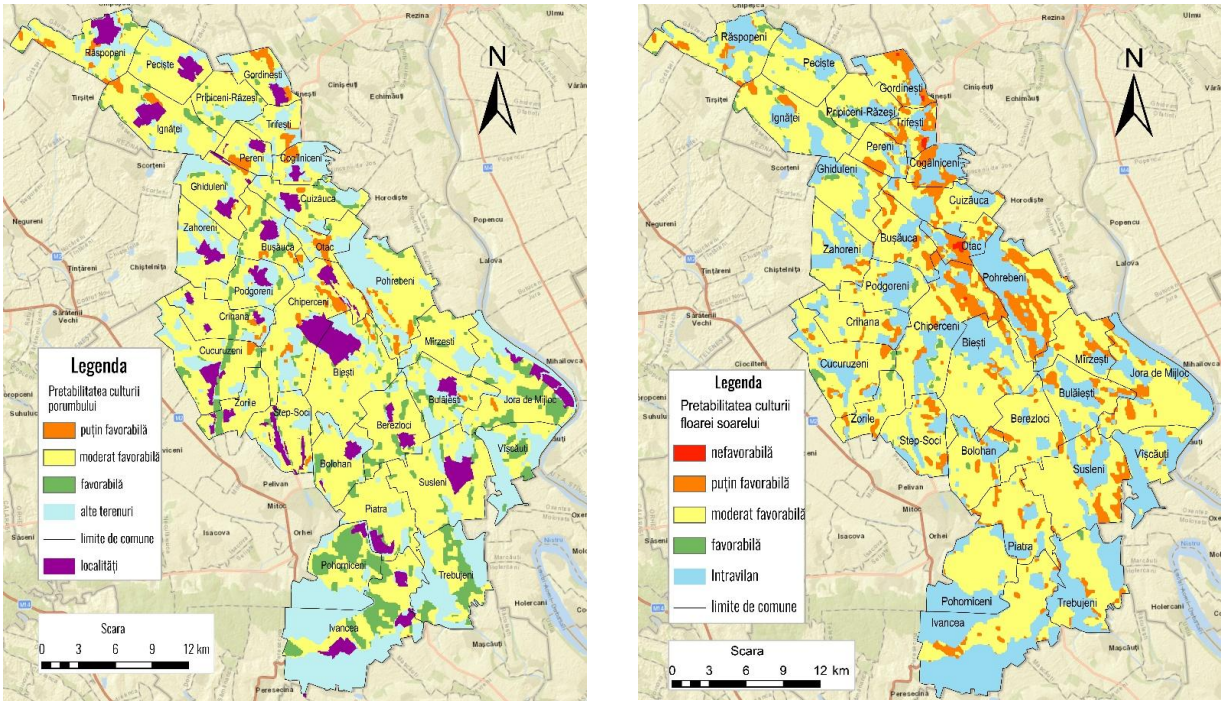
Suitability of agricultural crops

To produce the final maps (Figs. 5.1–5.5) showing the productivity potential of land for the main agricultural crops, the models of soil erodibility by crop category were combined with the models of climatic suitability for the 12 crops. Additionally, where applicable, other indicators listed in the methodology (Annex 2) were also analyzed.



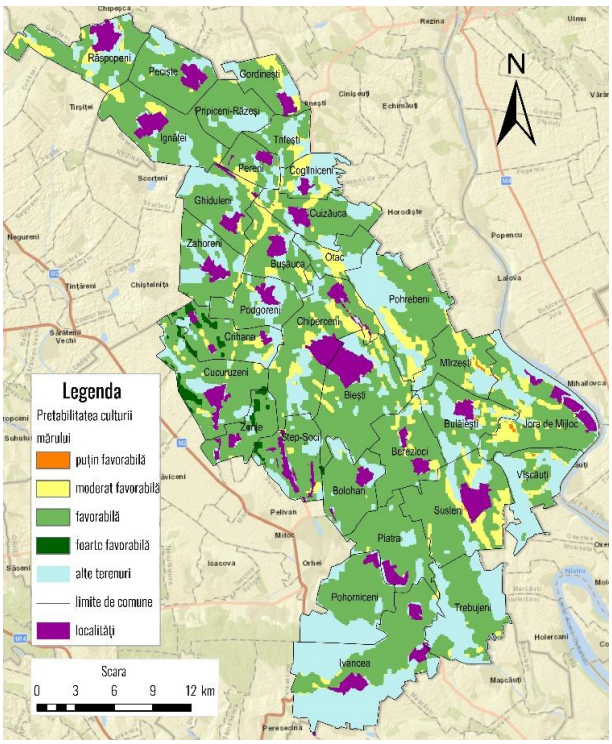
a) Wheat b) Barley

Figure 5. 1. Land productivity potential for compact crops

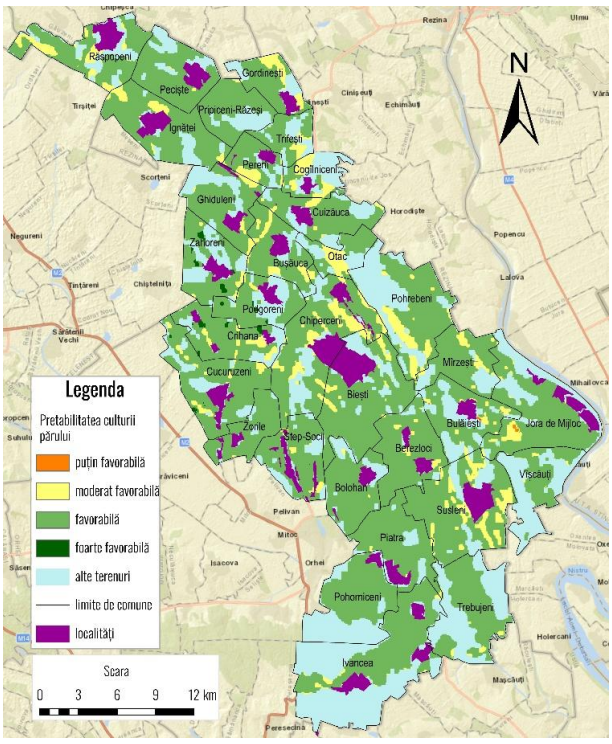


a) Corn b) Sun flower

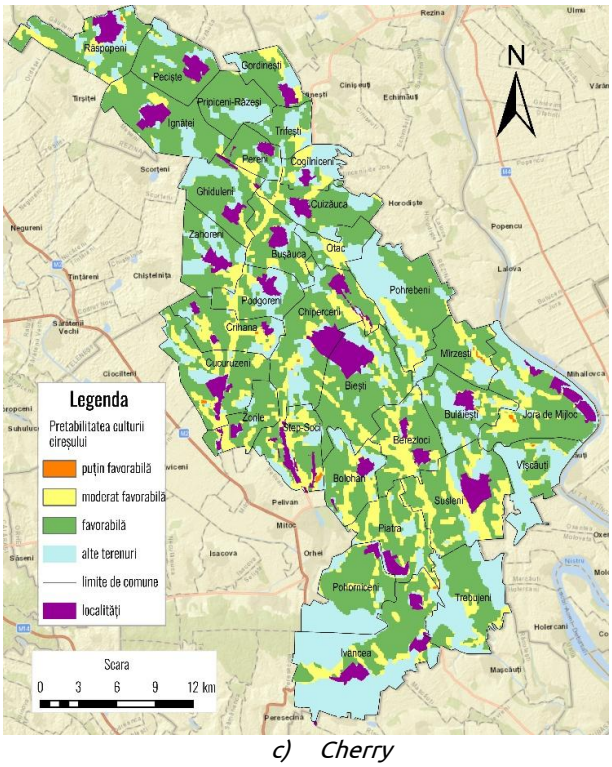
Figure 5. 2. Land productivity potential for row crops



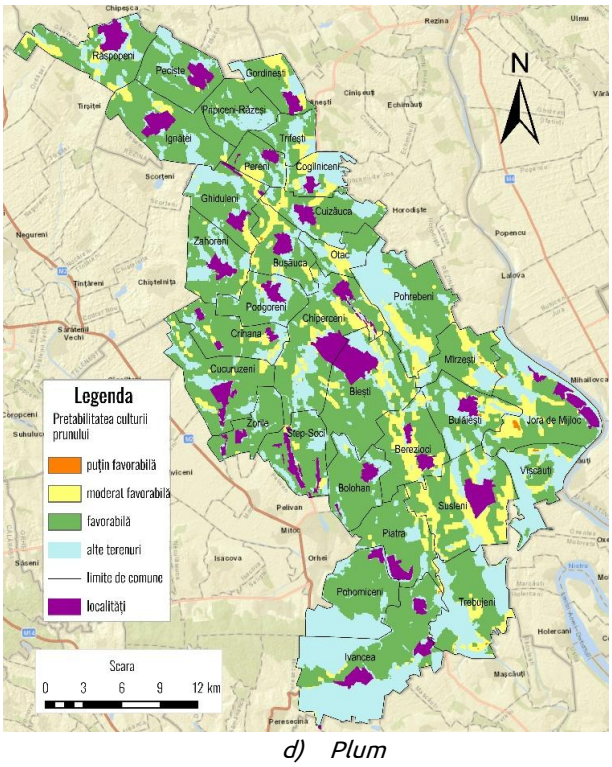
a) Apple



b) Pear

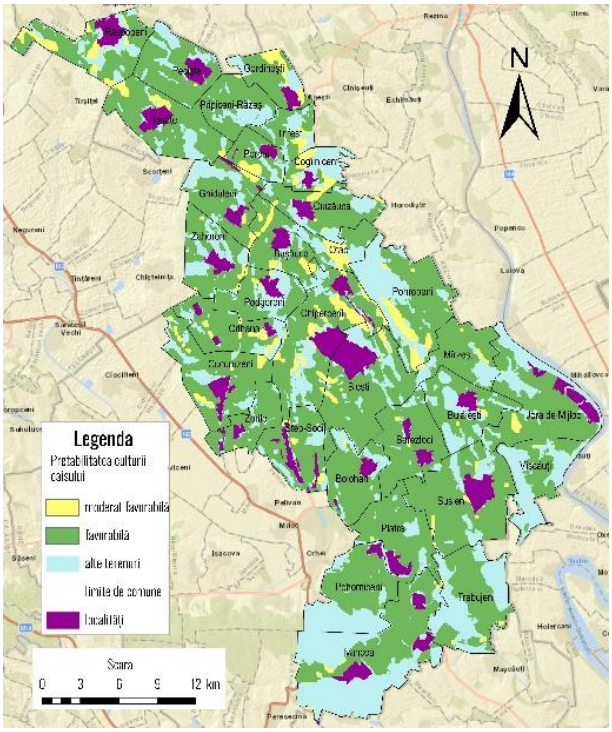


c) Cherry

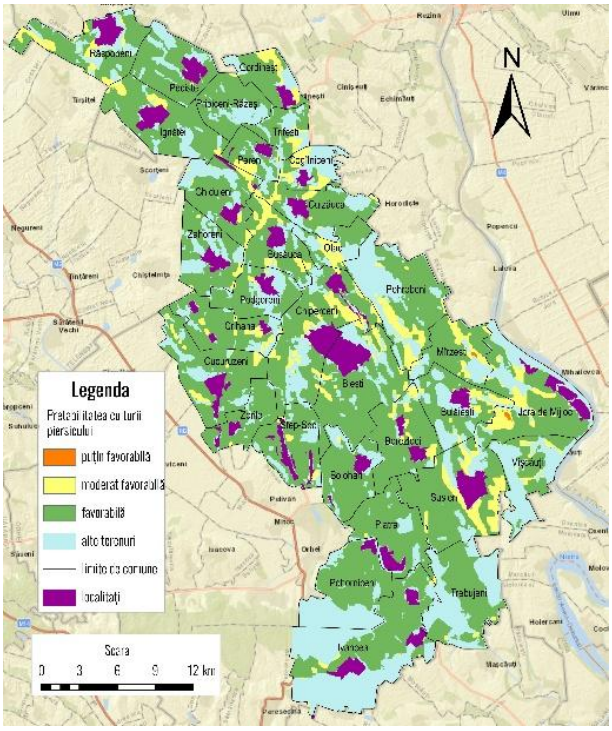


d) Plum

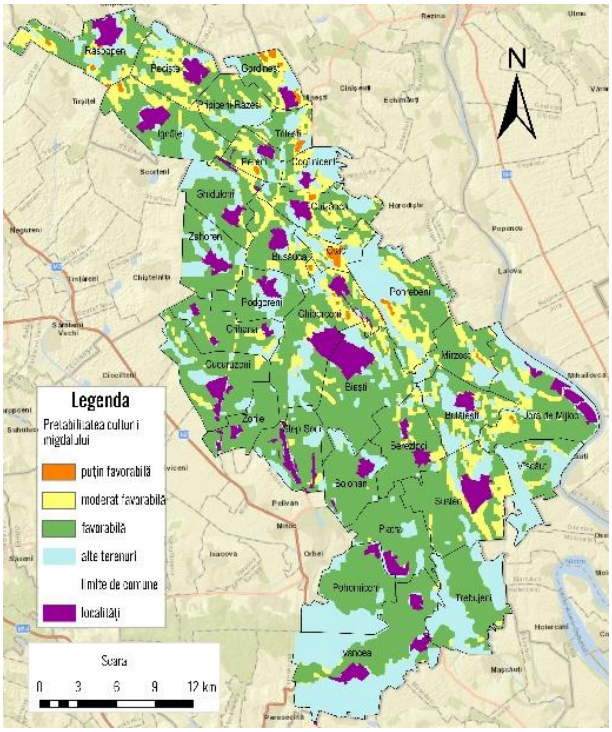
Figure 5. 3. Land productivity potential for moderate fruit crops



a) Apricot



b) Peach



c) Almond

Figure 5.4. Land productivity potential for thermophilic fruit crops

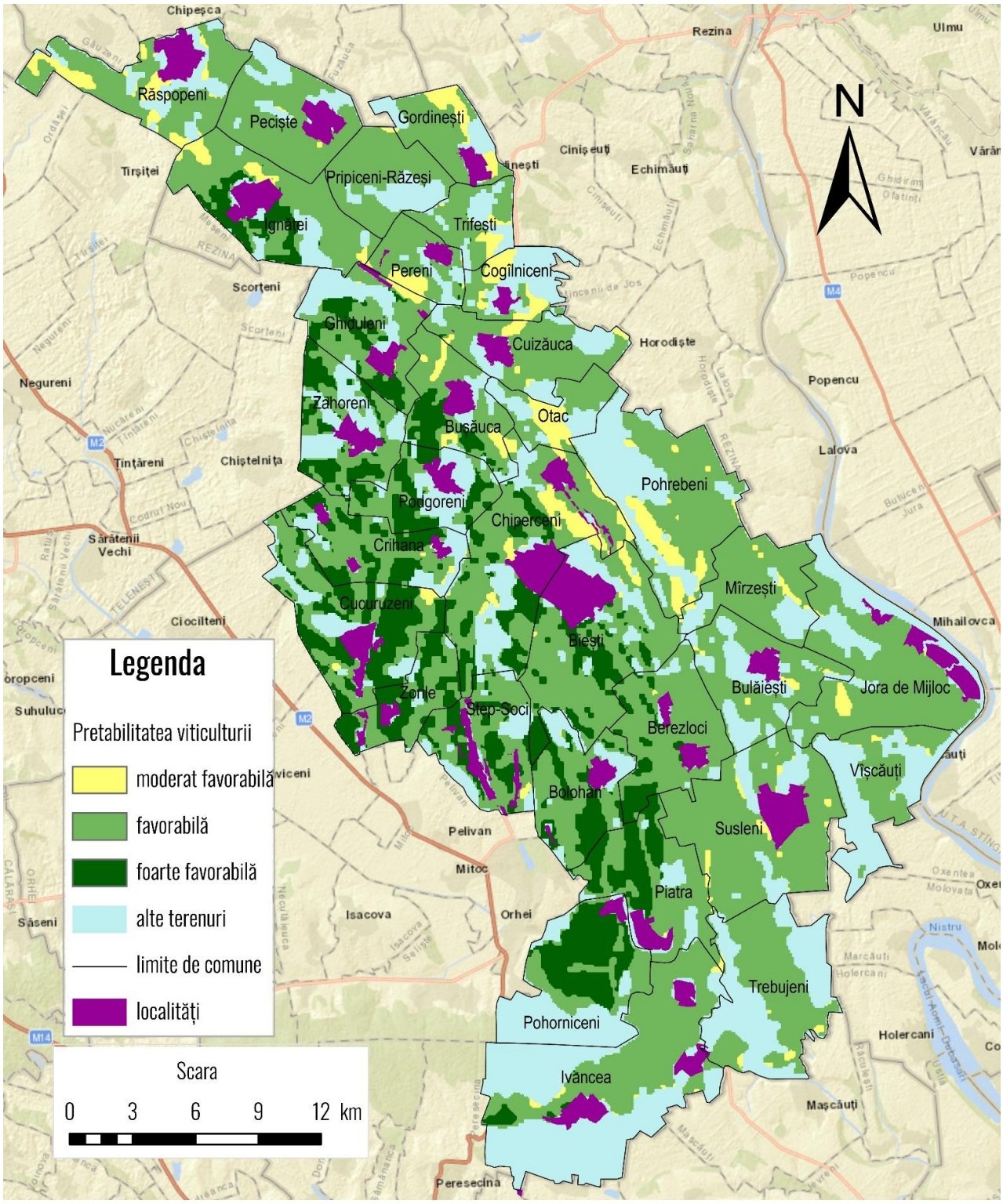


Figure 5. 5. Land productivity potential for viticulture