MINISTERUL MEDIULUI
AL REPUBLICII MOLDOVA

LDN
Land Degradation Neutrality
Target Setting Programme

United Nations
Convention to Combat Desertification

IMPLEMENTATION OF THE UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION IN THE REPUBLIC OF MOLDOVA

NATIONAL REPORT No **IV**

CHISINAU 2023

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Implementation of the United Nations Convention to Combat Desertification in the Republic of Moldova

NATIONAL REPORT No IV

Chisinau 2023

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The report is an overview of the state of desertification and land degradation neutrality in the Republic of Moldova, including a national narrative presentation of specific information in line with the indicators of the 2018-2030 Strategic Framework of the UN Convention to Combat Desertification, transposed into the Performance Review and Assessment of Implementation System (PRAIS) for reporting and validation.

This report serves as a benchmark for the country's progress in 2016-2019 and aims to raise awareness and support national stakeholders and development partners for expertise and benchmarking in the process of implementing the legal prerogatives to combat desertification in the Republic of Moldova.

The overall scientific and organisational coordination of the work was carried out under the editorship of the State Hydrometeorological Service (Mihail Grigoraș), and methodological guidance was provided jointly by the Institute of Ecology and Geography of the State University of Moldova (Iurie Bejan) and the NGO EcoContact (Ecaterina Melnicenco).

The processing, systematisation and synthesis of the information and observation data presented in the Report were carried out in accordance with the specific objectives by a team of professionals – members of the interdepartmental working group:

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FOREWORD

Acknowledging the escalating threat of land degradation, the Republic of Moldova committed to the United Nations Convention to Combat Desertification (UNCCD) through the enactment of Parliament Decision No 257 in 1998.

Since then, our country has consistently honored its obligations, engaging actively in both regional and international efforts to tackle desertification and land degradation.

In the recent period, the Republic of Moldova has recorded notable advancements in fulfilling the Convention's mandates and in responding to climate change:

- *Established the Lower Nistru National Park (via Law No 71 of 31.03.2022)*
- *Initiated the 2023-2032 National Strategy for Forest Expansion and Rehabilitation, which includes a detailed action plan for 2023-2027*
- *Started the 'Joint Actions for Afforestation of Moldova' campaign*
- *Created the Emerald Network (through Law No 225 of 13.10.2022) to safeguard ecologically important areas*
- *Endorsed the Glasgow Declaration (UK), pledging to cease deforestation and land degradation by 2030*

Evaluating land cover degradation reveals that during the initial period (2016-2019), 2.4% of land was degraded, but there was a slight improvement of 0.1% in land condition in the subsequent reporting period. The analysis of land productivity trends indicates a considerable amount of agricultural land exhibiting declining productivity initially, with a transition towards more stable or enhanced conditions in recent times.

Additionally, there's been a reduction in both the extent of lands classified as degraded and those moderately degraded. In the initial period, lands showing productivity degradation made up 13.9% of all categories, while lands with improved productivity represented another 19.3%.

Furthermore, there's a decline in carbon reserves within forests, wetlands, and urban areas, with a marginal increase in carbon stocks in cropland areas.

The percentage of degraded land in comparison to the total land area was 16.3% in the initial period, which has reduced to 5.4% in the reporting period, suggesting a relative amelioration.

It is crucial to recognize that the national reporting mechanism is essential for effective planning and enacting the Convention, aiming to fulfil strategic goals at both global and national scales. The information submitted by member countries for the report is also beneficial for other entities involved in executing the Convention at national and local levels.

To avert and remedy desertification, significant policy reforms and management approach alterations are required. Further efforts are needed in areas such as promoting awareness, enhancing capacity building and training in sustainable land management practices, offering advisory services, and broadening the reach of agricultural services to producers and land users. Such strategies ought to be implemented with the energetic involvement of stakeholders and local communities at both local and global scales.

I am convinced that this report that contains the results of assessment is an instrumental resource for addressing environmental challenges pertaining to droughts, land degradation, and desertification at local, national, and regional scales, and I am hopeful that this document will act as an agent for elevating public consciousness on these critical issues.

Minister of the Environment

Iordanca Rodica IORDANOV

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

RM	Republic of Moldova
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
FAO	Food and Agriculture Organization of the United Nations
WMO	World Meteorological Organization
ESA CCI-LC	European Space Agency Climate Change Initiative Land Cover
ISRIC	International Soil Reference and Information Centre
IPCC	Tier 1 Intergovernmental Panel on Climate Change
JRC	Joint Research Centre of the European Commission
COP	Conference of the Parties
MoE	Ministry of Environment
MAFI	Ministry of Agriculture and Food Industry
NBS	National Bureau of Statistics of the Republic of Moldova
SHS	State Hydrometeorological Service
NBS	National Bureau of Statistics of the Republic of Moldova
SDGs	Sustainable Development Goals
PRAIS	Performance Review and Assessment of Implementation System
SO	Specific Objective
SOC	Soil Organic Carbon Indicator
NPP	Net Primary Productivity
NDVI	Normalized Difference Vegetation Index
EVI	Enhanced Vegetation Index
DVI	Drought Vulnerability Index
SPI	Standardised Precipitation Index
LPD	Land Productivity Dynamics
MODIS	Moderate Resolution Imaging Spectrometer

International framework

Established in 1994, the United Nations Convention to Combat Desertification (UNCCD), one of the three Rio Conventions, specifically addresses arid, semi-arid and dry semi-humid areas known as drylands. The Convention's mission is to improve the living conditions of people in drylands, maintain and restore land and soil productivity and mitigate the effects of drought through national programs supported by international cooperation agreements. The UNCCD 2018–2030 Strategic Framework contains 5 strategic objectives to achieve LDN:

Strategic Objective 1:	Improve the condition of affected ecosystems, combat desertification/ land degradation, promote sustainable land management;
Strategic Objective 2:	Improve the living conditions of affected populations;
Strategic Objective 3:	Mitigate, adapt to, and manage the impacts of drought in order to enhance resilience of vulnerable populations and ecosystems;
Strategic Objective 4:	Generate global environmental benefits through effective implementation of the UNCCD;
Strategic Objective 5:	Mobilise financial and non-financial resources to support the implementation of the Convention by building partnerships at global and national level[1].

UNCCD is the institution responsible for the implementation of the Sustainable Development Goal (SDG) targets on LDN (SDG 15.3.1) and Indicator 15.3.1: *Proportion of land that is degraded over total land area.* Since 2018, data on this indicator is collected every four years through UNCCD's national reporting and review process.

The UNCCD is composed of three distinct units: the Secretariat, the Global Mechanism and the Evaluation Office. All three units operate in a systematic manner and support the subsidiary bodies to enable decision-making and advance the vision of the Convention through strategic objectives. The functions of each unit are described in the following sections.

SECRETARIAT

The secretariat is responsible for servicing the sessions of the COP and its subsidiary bodies, from the preparation of documentation to the logistics of the sessions, in such a way that informed decisions can be made and successful action can be taken to facilitate the implementation of the UNCCD. The Secretariat maintains the reporting platform – the Performance Review and Assessment of Implementation System (PRAIS), which allows countries to validate and submit national reports on the indicators of the UNCCD 2018-2030 Strategic Framework.

GLOBAL MECHANISM

The Global Mechanism supports countries in mobilising financial resources to implement the Convention and address desertification, land degradation and drought. It is the operational component of the Convention, providing advisory services and working with developing countries, the private sector and donors to mobilise significant resources for UNCCD implementation.

EVALUATION OFFICE

The Evaluation Office is responsible for monitoring and evaluating planned results. Systematic monitoring and evaluation of activities implemented under the UNCCD started in 2014. The Evaluation Office plans and schedules evaluations, engages independent evaluators, organises knowledge sharing of evaluation findings and monitors the implementation of evaluation recommendations.

UNCCD IN THE REGION

The UNCCD coordinates the work of partner countries through regional associations. The Europe and Central Asia region, comprising more than 50 countries, is organised into 3 regional implementing associations, with Regional Association V (Central and Eastern Europe) coordinating the RM. The decisions of the Conference of the

1 Source: UNCCD 2018–2030 Strategic Framework.

Parties shall apply to all countries belonging to regional associations. At the same time, with the assistance of the regional committees, each association defines regional priorities and identifies relevant regional initiatives and partnerships to strengthen regional coordination and co-operation.

National Framework. Stages and objectives of the implementation of the Convention in Moldova

Recognising the growing risk of land degradation, the Republic of Moldova acceded to the Convention by Parliament Decision 257-XIV of 24 December 1998.

On 13 April 2000, by Government Decision No 367, the National Action Program to Combat Desertification in the Republic of Moldova was drafted and approved as the policy framework for the first reporting period 2001-2005.

In 2001-2003 and 2003-2005, Moldova submitted its first two national progress reports on combating desertification in accordance with the Convention's biennial reporting procedure.

In 2006 – International Year of Deserts and Desertification and in 2007 the National Focal Point and the Interdepartmental Working Group for Combating Desertification in the Republic of Moldova prepared the National Report No III on the implementation of the provisions of the Convention in the Republic of Moldova.

Subsequently, in 2007, as a result of the government's reorganisation in the central environmental authority and due to institutional uncertainty and lack of continuity in promoting the Convention, RM did not participate in two reporting periods (2008-2010 and 2010-2012) and this segment remained uncovered until 2012.

From 2012, the reporting periods have been extended from 2 to 4 years, with the following reporting period covering 2012-2015.

During this period, RM fulfilled its commitments by submitting the National Report No IV on the implementation of the LDN and SLN in accordance with the procedure established by the Secretariat and the Global Mechanism of the Convention.

In 2021, the Convention set a deadline for the submission of final reports: December 2022 (SOs 1 and 2) to February 2023 (for SOs 3, 4 and 5). This report covers the period 2016-2019.

Therefore, after a series of institutional and organisational uncertainties related to the regional political, pandemic and energy crises, the reorganisation of the government and the separation of the Ministry of Environment from the Ministry of Agriculture, the work of the focal point responsible for the implementation of the Convention was resumed.

By Order of the Minister of Environment No 31 of 17 March 2022, the composition of the Working Group for the development of the National Report No IV was approved, and between 2022 and 2023, the State Hydrometeorological Service, as the National Focal Point of the Convention, together with other relevant institutions, developed the National Report, which was posted on the PRAIS4 reporting platform. The report was completed with all necessary data and relevant comments and successfully submitted to the UNCCD Secretariat.

The updating and maintenance of PRAIS has been made possible through the continued support of the Global Support Programme funded by the Global Environment Facility (GEF) and implemented by the United Nations Environment Programme (UNEP) with the assistance of partners from the Food and Agriculture Organization of the United Nations (FAO) and the NGO EcoContact.

It should be noted that the national reporting process is an indispensable tool to promote effective planning and implementation of the Convention, as well as the achievement of strategic objectives at the global and national levels. The information provided by Parties through reporting is also of value to other stakeholders working on UNCCD implementation at national and local levels.

LAND DEGRADATION NEUTRALITY INITIATIVE

In 2015, Parties to the Convention were invited to formulate voluntary targets to achieve *'Land Degradation Neutrality'* (LDN) in accordance with specific national circumstances and development priorities.

The Global Mechanism and the UNCCD Secretariat have developed the Land Degradation Neutrality Targets Programme (LDN TSP), which guides countries through a structured process to help value, assess, measure and deliver on LDN commitments.

The process of setting national LDN targets includes establishing national baselines, developing voluntary national targets and related measures to achieve the LDN. The program provides practical tools and guidance to accelerate the implementation of transformative programs and projects.

RM joined the UNCCD LDN initiative in May 2016 to prioritise effective policy interventions 'to achieve zero net loss of productive land/soils by 2030 and enhance drought resilience, adaptive capacity and biodiversity services of agricultural ecosystems'. Key interventions to improve land sector sustainability and achieve the 2030 Development Agenda goals, summarised in the report to a national scale, include:

- establishment of a 'restoration fund' for ecological restoration and improvement of the condition and quality of approximately 880,000 hectares of degraded land;
- creation of a green belt of buffer strips for agricultural land and soil conservation;
- expansion of the national forest fund by 15% to improve the sustainability of the land sector and promote increased biodiversity services and carbon stocks;
- rehabilitation of 1,588 sites contaminated with organic pollutants and prevention of new accumulations of pesticides, chemicals and other hazardous substances.

The advantages of applying for the LDN program for the RM include:

- ***Technical and financial support:*** The LDN program provides technical expertise and financial support to countries or projects working towards land degradation neutrality.
- ***International cooperation:*** Participation in the LDN program allows the RM to cooperate with other countries and organisations working towards land degradation neutrality.
- ***Improved sustainability:*** The implementation of LDN principles will contribute to the sustainability of land use and management in the RM.
- ***Global recognition:*** Participation in the LDN program can bring global recognition to Moldova's efforts to combat land degradation.

DROUGHT MANAGEMENT INITIATIVE

Moldova's accession to these two Convention initiatives and subsequent awareness-raising activities facilitated an extensive expert consultation process. The overall objective and conclusion of the approach was to promote a national drought policy based on reactive, crisis-resilient drought management practices to create a unified environment that should, as a consequence, enhance the preparedness of vulnerable sectors and encourage major producers to adopt proactive risk management strategies that reduce vulnerability to climate variability and drought.

The main innovations of the new Moldovan drought policy are:

a. better understanding of climate variability and the environmental impact of drought;
b. assessment of the relevance of drought indicators for vulnerable development sectors;
c. a proactive strategy based on principles of risk mitigation rather than crisis management;
d. localisation of public policies;
e. targeted and transformed climate knowledge for end-users and decision-makers;
f. state support in some years when drought becomes a socio-economic disaster.

The experience of the RM shows that while there are many innovations and tools for drought management ready to be applied, there are significant barriers to utilising these innovative measures in the context of limited financial resources.

SOIL AND LAND DEGRADATION MANAGEMENT APPROACHES TO DROUGHT MITIGATION IN NATIONAL POLICY DOCUMENTS

In recent years, soil and land degradation management in the context of drought mitigation has been promoted through the following projects and activities:

- FAO: achieving land degradation neutrality, climate-smart agriculture and forest buffer strips;
- IFAD: promotion of the concept of conservation agriculture, creation of forest buffer strips;
- UNDP, IFAD: promoting resource utilisation through watersheds;

- FAO, MAFI: contribution to improving legal and policy frameworks for achieving Negotiated Territorial Development (NTD);
- FAO: climate-smart agriculture and emergency drought mitigation project;;
- FDD: rehabilitation of central irrigation systems and irrigation infrastructures;
- World Bank (CAPMU): post-investment land management grants program.

The Organisation for the Development of Entrepreneurship (ODA) runs a number of programs aimed at training, facilitating access to finance, and the creation and development of small and medium-sized enterprises by migrants and women. For rural areas, ODA has a special support program 'Small and Medium-sized Enterprises in Rural Areas', which is a continuation of the 'Women in Business' program.

During the reporting period, with the support of FAO and other development partners, the Government of the Republic of Moldova incorporated the LDN concept and principles for achieving LDN into the following regulations and sectoral policy documents:

- Law No 1041/2000 on Improvement of Degraded Land though Afforestation;
- Rural Development Strategy for 2014-2020, approved by GD no 409/2014;
- Strategy for Equality between Men and Women in the Republic of Moldova for 2017-2021;
- Land Reclamation Program for Sustainable Soil Resources Management for 2021-2025, approved by GD 864/2020;
- Regulation on the conditions and procedure for granting advance subsidies for land reclamation investment projects for implementation of the Land Reclamation Program for Sustainable Soil Resources Management for 2021-2025, approved by GD No 985/2020.

USEFULNESS AND APPLICABILITY OF THE REPORT IN RM:

- ***Assessing progress:*** The report provides a comprehensive assessment of the RM's efforts to implement the UNCCD, including achievements, challenges and areas for improvement. It helps to assess the effectiveness of existing strategies and identify gaps in their implementation.
- ***Accountability and transparency:*** The report serves as a mechanism to ensure accountability and transparency in the implementation process. Documenting actions taken, results achieved and resources utilised helps to hold stakeholders accountable for their commitments and promotes transparency in governance.
- ***Policy refinement and decision-making:*** The report informs policy makers about the progress of UNCCD implementation in Moldova. It provides valuable insights into the impact of policies and measures, enabling them to refine existing strategies, develop new initiatives and effectively allocate resources to address desertification and land degradation.
- ***Awareness:*** The report raises awareness among stakeholders, including government officials, civil society organisations, local communities and the general public. It helps disseminate information about the importance of combating desertification, the challenges faced and potential solutions.
- ***International cooperation and funding:*** Reporting on UNCCD implementation demonstrates Moldova's commitment to addressing desertification problems and compliance with international agreements, which improves the country's position in the international community and can attract support, cooperation and funding from international organisations, donor agencies.
- ***Learning from best practices:*** The report preparation process encourages a thorough review of the initiatives, programs and projects implemented under the UNCCD. This allows best practices, successful approaches and lessons learned to be identified and documented.

Reporting on UNCCD implementation in Moldova is important for measuring progress, enhancing accountability, informing policy decisions, raising awareness, promoting international cooperation and facilitating the learning of best practices.

This document plays a critical role in advancing the country's efforts to combat desertification, protect land resources and achieve sustainable development.

EXECUTIVE SUMMARY

This report is an overview of the state of desertification and land degradation neutrality in the Republic of Moldova, including a national narrative presentation of specific data and information in line with the indicators of the UNCCD 2018-2030 Strategic Framework, transposed into the Performance Review and Assessment of Implementation System (PRAIS) for reporting and validation.

This report serves as a benchmark of the country's progress and aims to raise awareness and support national stakeholders and development partners for expertise and benchmarking in the process of implementing the legal prerogatives to combat desertification and ensure land degradation neutrality in the Republic of Moldova during the reporting period 2016-2019.

In line with the UNCCD 2018-2030 Strategic Framework, the Report consists of 5 strategic objectives:

Strategic Objective 1 reflects progress in improving the condition of affected ecosystems, combating desertification/land degradation, promoting sustainable land management and contributing to land degradation neutrality. This section describes general trends in land cover, trends in land productivity or functioning, trends in carbon stocks (including in soil), and the proportion of land that is degraded over total land area.

Strategic Objective 2 – to improve the living conditions of affected populations – reflects trends in social well-being and population development/income inequality, trends in access to safe drinking water, trends in the proportion of the population exposed to land degradation.

Strategic Objective 3 focuses on drought and relates to mitigating, adapting to and managing the impacts of drought to enhance the resilience of vulnerable populations and ecosystems. As in the previous sections, trends in the proportion of land under drought over the total land area, the share of the population exposed to drought, and the degree of vulnerability to drought are shown here.

The process of generating global environmental benefits through effective implementation of the UNCCD is described in ***Strategic Objective 4,*** which shows trends in the diversity and distribution of individual species and the share of protected areas by ecosystem type.

The status of mobilising additional financial and non-financial resources to support the implementation of the Convention through effective partnerships at the global and national levels is reflected in ***Strategic Objective 5,*** which describes trends in official development assistance, trends in domestic (national) public financial resources and prospects for future support for activities related to the implementation of the Convention.

The report concludes with general conclusions and recommendations for the national and implementing frameworks, as well as a roadmap.

The entire content of the Report is accompanied by fact sheets containing national statistics, maps and data on indicators and country efforts related to the Convention.

REPUBLIC OF MOLDOVA PROFILE

The Republic of Moldova is located in the south-eastern part of Europe, on an area of 33,843.5 km^2. It borders Romania to the west and Ukraine to the north, east and south. Moldova stretches 350 kilometres from north to south and 150 kilometres from west to east. Geographical extremes: in the north – Naslavcea village, Ocniţa district (48°29′39″N), in the south – Giurgiuleşti village, Cahul district (45°28′39′′N), in the west – Criva village, Briceni district (26°37′39′′E), in the east – Palanca village, Ştefan-Voda district (30°09′39′′E).

Main rivers: Nistru (660 km within Moldova), Prut (695 km within Moldova), Raut (286 km), Bâc (155 km), Botna (152 km). The largest natural lakes are Beleu with an area of 6.3 km^2, Manta – 4.5 km^2, Salaş – 3.7 km^2, Nistrul Vechi – 1.9 km^2.

The altitudes of the RM vary between a maximum of 429 m (Balanesti hill, Nisporeni district) and a minimum of 4 m (Palanca village, Ştefan-Voda district).

The total length of the state border is 1,906 km (951 km by water and 955 km by land). The border with Romania along the Prut River is 684 km long, from the vicinity of Criva village (Briceni district) to the confluence of the Prut and the Danube Rivers (0.5 km south-west of Giurgiuleşti village, Cahul district).

The border with Ukraine runs 1,222 km between the villages of Criva and Naslavcea, then along the Nistru River to the village of Nimereuca (Soroca district), then, framing the territory east of the Nistru River to the village of Palanca (Stefan-Voda district), crossing the Nistru-Prut interfluve to the Danube River. The length of the land section of the Moldovan-Ukrainian border is 955 km, the length of the water section is 267 km, including 204.3 km along the Nistru River. The northern part of the Moldovan-Ukrainian section of the Moldovan state border is 297.3 km. The eastern part of the Moldovan-Ukrainian section is 453.4 km and the southern part is 471.3 km.

The system of state-protected natural areas in Moldova includes almost all categories of ecosystems – forest, steppe, grassland and petrophytic ecosystems. According to the Law No 1538/1998 on the Fund of State Protected Natural Areas (FSPNA), the FSPNA has a total area of 210,695.87 hectares (2106.96 km^2), representing 5.8% of the country's total territory.

The state fund of natural protected areas includes a total of 312 protected areas, 158 secular tree sites (429 trees in total) and 472 rare species of flora and fauna (additionally: 9 families and 3 orders), including: Orhei National Park; Lower Prut Biosphere Reserve; five scientific reserves; nature monuments (geological and paleontological, hydrological, botanical); forest/medicinal plant/mixed reserves; geographical landscape reserves; resource reserves; wetlands of international importance (Ramsar); monuments of landscape architecture; dendrological and zoological gardens.

The territory of the RM is organised on two levels. The first level consists of villages and towns, the second – districts, municipalities, the autonomous territorial unit of Gagauzia and the administrative territorial units on the left bank of the Nistru River.

Administratively, the territory of the Republic is divided into 32 districts with 1,681 settlements, including 5 municipalities, 60 towns, 40 settlements within towns (municipalities), 917 villages and 1,507 settlements within communes.

Economically, Moldova is an agro-industrial country, specialising in viticulture, fruit, vegetables and other crops, as well as manufacturing, light industry, chemical industry, etc. The main industrial centers are Chişinau, Tiraspol, Balţi, Bender and Râbniţa. The share of the population currently employed in agriculture is 20.8% of the active population and the sector's contribution to GDP is 7.9%.

There are about 15,000 cultural heritage sites on the territory of the Republic, of which 5,206 monuments are included in the Register of State Protected Monuments: 2,696 monuments of archaeology, 1,284 monuments of history, 1,261 monuments of architecture and 225 monuments of art.

SPECIFIC OBJECTIVE 1

TO IMPROVE THE CONDITION OF AFFECTED ECOSYSTEMS, COMBAT DESERTIFICATION, PROMOTE SUSTAINABLE LAND MANAGEMENT AND CONTRIBUTE TO LAND DEGRADATION NEUTRALITY

1.1. Trends in land cover

1.1.1. Methodologies used

The UN Convention to Combat Desertification methodology for assessing the proportion of land that is degraded over total land area (indicator 15.3.1 of the Sustainable Development Goals (SDGs)) uses land cover change as an indicator of the dynamics of ecosystem change due to natural and/or anthropogenic factors. The main output of the SO1-1 reporting process is a set of formally validated estimates of the extent of land cover categories, their changes at the national level and their significance in terms of land degradation.

National reporting is facilitated by the provision of:

I. default data from available global data sources, i.e. European Space Agency Climate Change Initiative Land Cover products (ESA CCI-LC); and

II. Guidelines for interpreting transitions between land cover categories as processes that are likely to reduce the productivity and biological or economic complexity of the land (degradation) with a view to improving it or maintaining its 'stability'.

UNCCD Default Data and *Trends* were used in the report preparation process. *Earth Land Porductivity Dinamics*. At this stage of reporting, it was decided to use predefined data due to insufficient national data to cover all reporting stages. Thus, land cover/land use was performed only for 2000 and 2004 (using different methodologies: CORINE and FAO). Currently, projects are underway in the RM to produce LULC maps for the whole territory for 2018 and 2024. Therefore, to present the situation in this section, national data have been used according to the following steps:

Step 1: Report on land area. Related areas in the PRAIS 4 platform: *Table SO1-1.T1.* Information on the total land area, area covered by water bodies, and total country area is required to calculate the proportion of land that is degraded over total land area (SDG indicator 15.3.1), but also to calculate indicators to track progress towards other SOs (e.g. SO 3-1: Trends in the proportion of land under drought over the total land area). Total land area, total water bodies area and total country area require respective estimates to be reported in square kilometres (km^2) every five years from 2000 to 2015, and then for the most recent reported year. Land area data is pre-filled in the reporting table SO1-1.T1. Estimates are based on the default land cover data and, as such, they could differ from official national statistics. The pre-filled data is editable and thus can be adjusted. However, it is important to ensure consistency with the land cover data and the SDG indicator 15.3.1 estimates. Any changes are to be justified in the 'Comments' column.

Step 2: Identify key degradation processes. Related areas in the PRAIS 4 platform: *Table SO1-1.T2.* The most relevant land cover change processes that are likely to result in a depletion of land resources are listed. Key processes might include deforestation, urban expansion or vegetation loss. Some of these processes may be detectable through the image analysis of land cover change, while others may only be evident with field observations.

Step 7: Estimate land cover degradation. Related areas in the PRAIS 4 platform: *tables SO1-1.T1, SO1-1.T5, SO1-1.T7 and SO1-1.T9* Default national estimates of land cover change and land cover degradation for the reporting period are made available in tables SO1-1.T5 and SO1-1.T7, respectively. These estimates are calculated by comparing the land cover in the most recent available year of the reporting period (i.e. 2019 for the default data) with that of the initial year of the reporting period (2016).

These estimates can be accepted, adjusted or replaced using national data, as appropriate. Using the selected data, legend and transition matrix, Parties may produce national estimates of:

I. land cover change;
II. land cover degradation;
III. land cover improvement; and
IV. no change for the reporting period through *Trends.Earth* and import the results to the PRAIS 4 platform, where the relevant maps can be created.

Step 8: Verify the results. The remote-sensing interpretation of land cover changes varies greatly across the globe, strongly influenced by the prevailing climatic conditions and land management practices. This may affect the reliability of applying estimates from global data sources to local areas and require inputs from national experts to identify and highlight situations where the confidence level of the obtained results might be low.

Step 9: Generate reports. The PRAIS 4 platform enables the reporting of quantitative information on land cover, land cover changes and land cover degradation. In the absence of more accurate and detailed data at the national level, Parties may officially submit to UNCCD the default estimates. For estimates generated using national data, Parties should provide:

- a description of the legend and transition matrix;
- national land cover datasets for the baseline and the reporting period;
- land cover change information, including a land cover area change matrix and a spatial dataset that shows the areas subject to degradation, improvement or no change based on land cover data.

Default maps or maps generated in *Trends.Earth* using national data representing land cover, land cover change and land cover degradation for the baseline/reporting period are made available in the PRAIS 4 platform. More specifically, the following maps will be available online:

- land cover map of the initial year of the baseline period (2000);
- land cover map of the final year of the baseline period year (2015);
- land cover map of the latest reporting year;
- land cover change in the baseline period;
- land cover change in the reporting period;
- land cover degradation in the baseline period;
- land cover degradation in the reporting period.

Land cover data are used not only for SO1-1 reporting, but also for stratification of land productivity and soil organic carbon (SOC) indicators (SO1-2 and SO1-3). This is one of the sub-indicators for calculating the proportion of land that is degraded over total land area (SO1-4).

1. ANALYSING THE STATUS AND TRENDS OF LAND COVER CHANGE

Land area

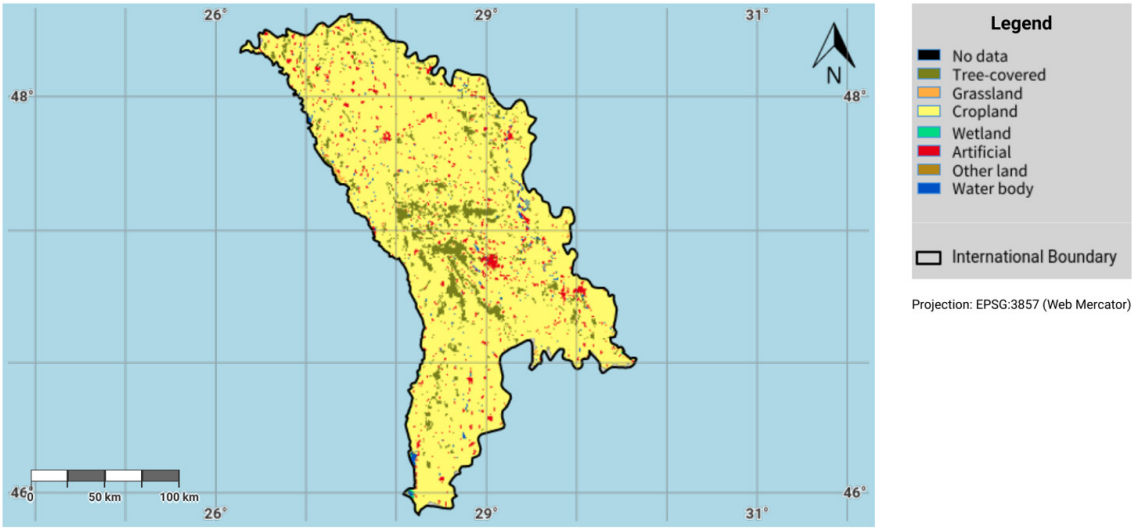
Total land area, water bodies area and total country area were shown for each of the five years from 2000 to 2015 and then for the most recent reporting year (Figure 1.1.).

The data show that between 2001 and 2019, at the national level, there has been an increase in land area at the expense of a 5% decrease in the area covered by water, due to the accelerated disappearance of water bodies due to siltation (Table SO1-1.T1).

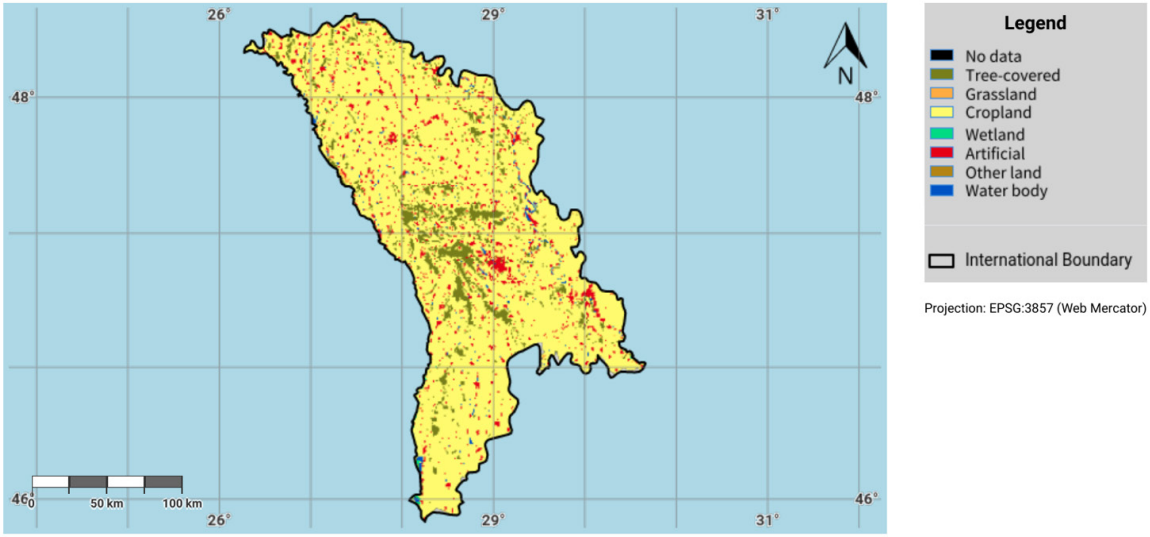
Table 1.1. SO1-1.T1: National estimates of total land area, water bodies area and total country area

Year	Land area (km²)	Water bodies (km²)	Total area (km²)	Actual area (km²)
2001	32878	330	33208	33846
2005	32879	329	33208	33846
2010	32875	333	33208	33846
2015	32883	325	33208	33846
2019	32894	314	33208	33846

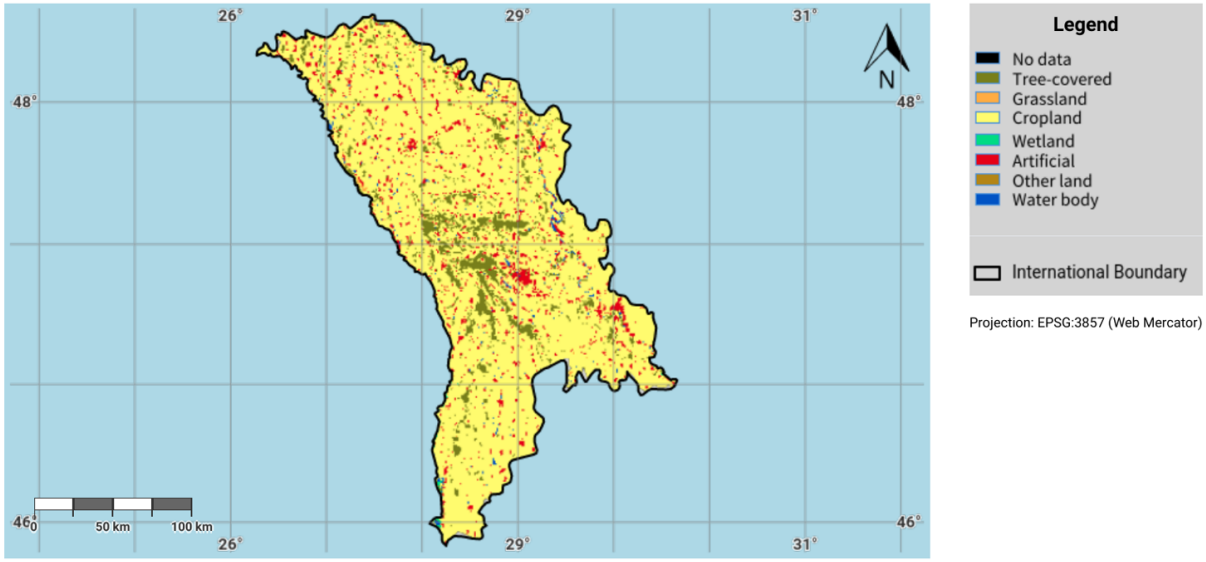
Republic of Moldova – SO1-1.M1
Land cover in the initial year of the baseline period



Republic of Moldova – SO1-1.M2
Land cover in the baseline year



Republic of Moldova – SO1-1.M3
Land cover in the latest reporting year



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Source Data Credits
- European Space Agency Climate Change Initiative Land Cover (ESA CCI-LC) product, 1992-2019. URL: https://www.esa-landcover-cci.org/

Figure 1.1. Land cover in the baseline period and in the reporting period

In terms of degradation processes, urbanisation is highlighted as one of the key processes, whereby agricultural land is transformed into built-up areas.

Table 1.2. SO1-1.T2: Key degradation processes

Degradation process	Land cover at the beginning	Land cover at the end
Final expansion	Agricultural land	Built-up areas

The land cover change matrix was completed by reporting national estimates of land cover fluxes, which represent the losses and gains from changes from one land cover class to another for the reference period.

Table 1.3. SO1-1.T4: UNCCD land cover legend transition matrix

Original/Final	Forested areas	Grasslands	Agricultural land	Wetlands	Built-up areas	Other land	Water bodies
Forested areas	0	-	-	-	-	-	0
Grasslands	+	0	+	-	-	-	0
Agricultural land	+	-	0	-	-	-	0
Wetlands	-	-	-	0	-	-	0
Built-up areas	+	+	+	+	0	+	0
Other land	+	+	+	+	-	0	0
Water bodies	0	0	0	0	0	0	0

Land cover

Annual national estimates of land cover class areas are presented and net changes in areas for the baseline and reporting periods (2000-2020) are calculated.

Overall, forested areas, wetlands and built-up areas increased between 2001 and 2019 at the expense of agricultural land (from 87% to 84%) and water bodies (Tables SO1-1.T5, SO1-1.T6, SO1-1.T7). The area of grassland has also decreased.

Table 1.4. SO1-1.T5: National land cover estimates (km^2) for the baseline and reporting periods

Year	Forested areas	Grasslands	Agricultural land	Wetlands	Built-up areas	Other land	Water bodies
2000	-	-	-	-	-	-	-
2001	2510	124	28897	49	1297	0	331
2002	2513	124	28641	49	1551	0	330
2003	2514	124	28388	49	1803	0	330
2004	2516	123	28115	49	2075	0	330
2005	2516	123	28115	49	2075	0	330
2006	2513	123	28111	49	2075	0	336
2007	2515	123	28110	51	2076	0	335
2008	2524	123	28081	51	2094	0	335
2009	2524	123	28082	52	2095	0	333
2010	2527	123	28077	52	2095	0	333
2011	2529	123	28075	52	2096	0	333
2012	2530	123	28074	54	2101	0	327
2013	2530	123	28072	54	2103	0	326
2014	2535	123	28064	54	2105	0	326
2015	2535	123	28063	54	2107	0	326
2016	2548	123	28054	55	2107	0	321
2017	2559	123	28046	56	2107	0	318
2018	2564	123	28042	57	2107	0	316
2019	2568	122	28039	57	2108	0	314
2020	-	-	-	-	-	-	-

Land cover degradation

The land cover change matrix was populated with data from national estimates of land cover flows, which represent losses and gains from changing from one land cover class to another during the reporting period.

Changes in land cover during the baseline period were insignificant, most of the territory remaining unchanged (Figure 1.2.).

Of course, these observations are not entirely true, but they do follow from the material used – predefined data with relatively low resolution.

A quantitative summary of land degraded or not degraded as a result of land cover change during the baseline period, presented as total area of degraded land cover in km^2 and area of degraded land as a share (%) of the total area of the country, is presented in Table 1.5.

Table 1.5. SO1-1.T8: National estimates of land cover degradation (km²) in the baseline period

	Land area (km²)	Share in total area (%)
Land area with degraded land cover	813	2.4
Land area with non-degraded land cover	32394	97.5
Land area with no land cover data	0	0.0

A quantitative summary of land degraded or not degraded as a result of land cover change during the reporting period, presented as total area of degraded land cover in km² and area of degraded land as a share (%) of the total area of the country, is presented in Table 1.6.

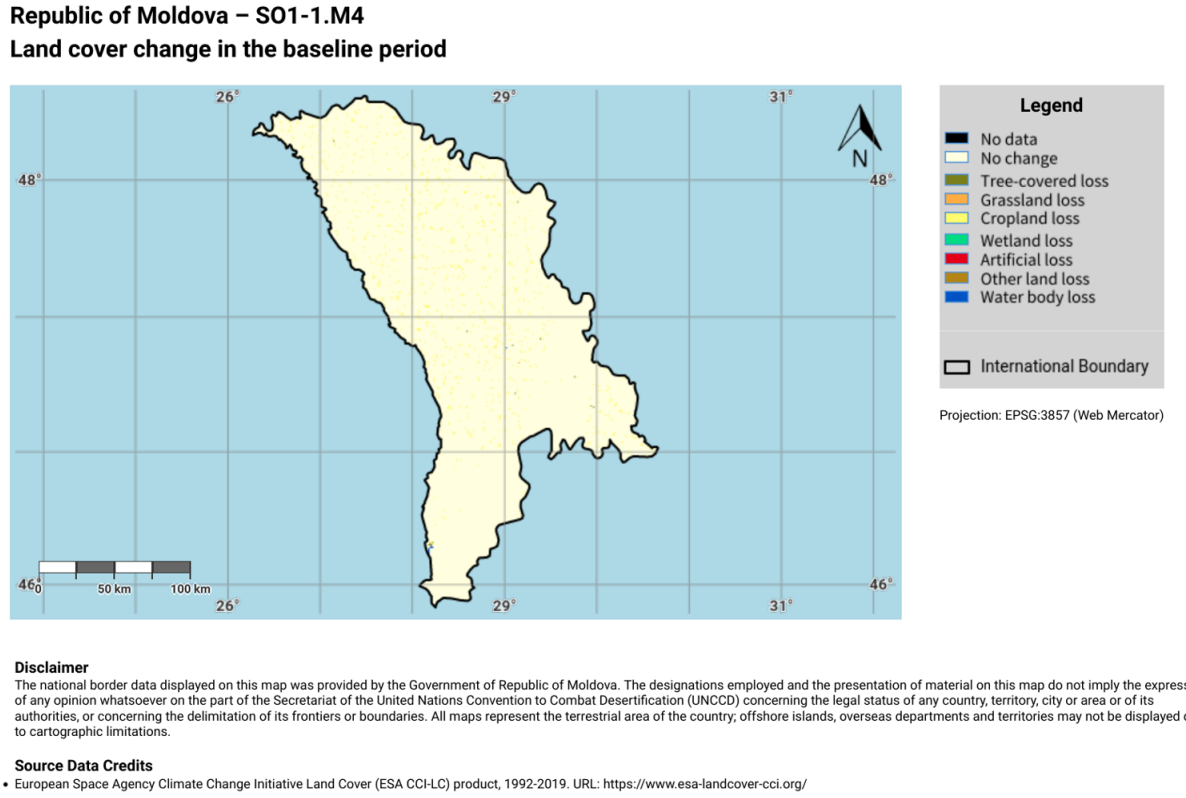

Figure 1.2. Changes in land cover during the baseline period

Table 1.6. SO1-1.T9: National estimates of land cover degradation (km²) in the reporting period

	Land area (km²)	Share in total area (%)
Land area with improved ground cover	34	0.1
Land area with stable land cover	33166	99.9
Land area with degraded land cover	8	0.0
Land area with no land cover data	0	0.0

The assessment of land cover degradation shows the share of degraded land at 2.4% in the baseline period and improvement of land cover degradation by 0.1% in the reporting period (Tables SO1-1.T8, SO1-1.T9). Land cover degradation over the baseline period is characterised by a spatially uniform distribution, largely associated with the shift of some land use categories, such as agricultural land, towards built-up land as a result of recent urbanisation (Figure 1.3).

Republic of Moldova – SO1-1.M6
Land cover degradation in the baseline period

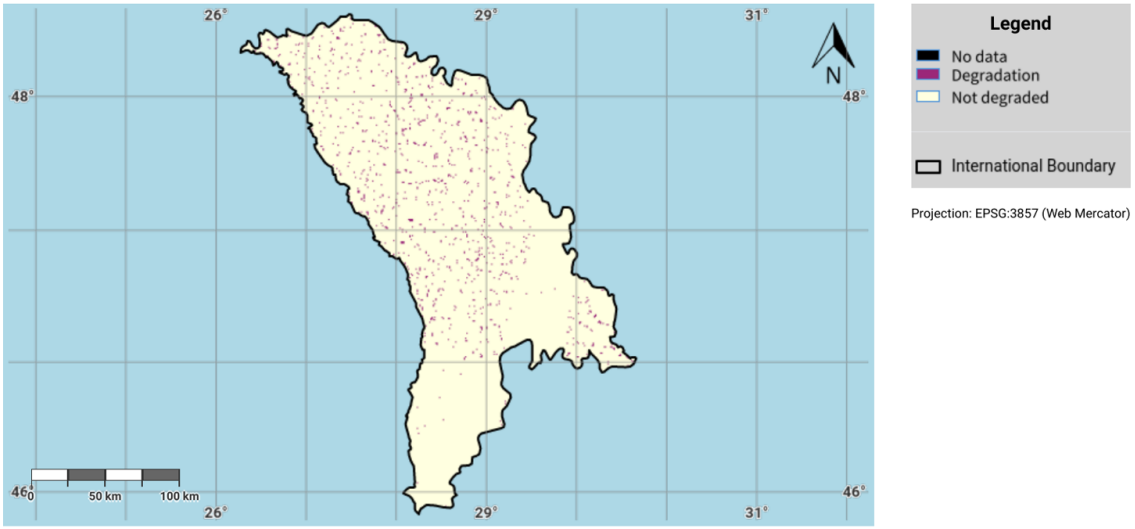

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Figure 1.3. Land cover degradation for the baseline period

1.1.2. Conclusions on the topic

We see that land degradation as a result of land use change is expressed mainly in the increase of built-up areas at the expense of natural and man-made areas.

One of the challenges we have faced in the reporting process relates to the availability and quality of national data. Thus, we found:

- the spatial resolution of default data may not always be adequate to accurately represent land cover and land cover change at the national level, especially for small countries that need data at the highest spatial resolution;
- at the same time, local data is not available, or if available, it is in inappropriate data structures (non-spatial tables).

1.1.3. Recommendations on solutions and necessary actions

Changes in land cover/land use indicate a tendency towards a decrease in natural areas such as forests, grasslands and water bodies. Additional attention is required from the authorities to increase the area of forests, grasslands and wetlands.

At the same time, increasing built-up areas at the expense of natural areas and agricultural land is a practice to be avoided.

1.2. Trends in land productivity

1.2.1. Methodologies used

Land productivity is the biological productive capacity of the land: the principal source of the food, fiber and fuel that sustains humans. The UNCCD methodology for estimating the proportion of land that is degraded over total land area (SDG 15.3.1) uses variations in land productivity as an indicator of long-term changes in the health and productive capacity of land.

Land productivity reflects the net effects of changes in ecosystem functioning on plant and biomass growth. Land productivity is calculated from Earth observation data representing net primary productivity (NPP).

Vegetation indices, such as the Normalized Difference Vegetation Index (NDVI) or the Enhanced Vegetation Index (EVI), are often used as proxies for NPP.

National reporting is facilitated though the provision of default data derived from available global data sources, namely

the Land Productivity Dynamics (LPD) dataset of the Joint Research Centre (JRC) of the European Commission.

The manual [SDG 15.3.1] provide an overview of land productivity and detail the methodology used to assess changes in land productivity.

Estimating land productivity degradation entails:

- producing a land productivity degradation map as a binary representation of degraded/not degraded land in the baseline period;
- mapping land productivity dynamics in the reporting period, indicating areas that have degraded, improved or remained stable compared to the baseline.

The step-by-step procedure for reporting is described in the following.

Step 1: Select Earth observation dataset. UNCCD provides default data from the LPD dataset of the JRC. The LPD dataset represents five classes of land productivity dynamics from 2000 to 2019. This dataset has a spatial resolution of 1 km, and it is derived from algorithms that combine NDVI time series data from various satellite sensors. An alternative global dataset is *Trends.Earth Land Productivity*, derived from MODIS satellite data, which integrates NDVI observations at 250 metre pixel resolution over 16-day periods between 18 February 2000 to now. Both datasets are available in Trends.Earth.

Step 7: Verify the results. The seasonal dynamics of productivity vary greatly across the globe, strongly influenced by the prevailing climatic conditions and land management practices. This may affect the reliability of applying estimates of land productivity from global data sources to local areas and require inputs from national experts to detect and highlight situations where the confidence level of the obtained results might be low.

Step 8: Generate reports. Once verified by the Parties, the estimates of land productivity dynamics and land degradation for the reporting and baseline periods should be officially submitted to UNCCD. Maps generated with default or national data on land productivity dynamics and land productivity degradation for the baseline and the reporting period will be created on the PRAIS 4 platform.

These maps will include:

- Land productivity dynamics in the baseline period;
- Land productivity dynamics in the reporting period;
- Land productivity degradation in the baseline period;
- Land productivity degradation in the reporting period.

ANALYSING THE STATUS AND TRENDS OF LAND COVER CHANGE

Land productivity dynamics

Productivity dynamics for different land cover categories show a high proportion of declining and moderately declining agricultural land during the baseline period (Table SO1-2.T1) and a shift of some agricultural land towards stable or improved land (Table SO1-2.T2).

We also see an overall decrease in the areas in the categories of degraded and moderately degraded land.

Table 1.7. SO1-2.T1: National estimates of land productivity dynamics (in km²) within each land cover class for the baseline period

Land cover class (km²)	Degrading (km²)	Moderate decline (km²)	Stressed (km²)	Stable (km²)	Improving (km²)	No data (km²)
Forested areas	53	288	0	1707	446	5
Grasslands	4	9	0	85	24	1
Agricultural land	1688	2314	2	21566	2424	61
Wetlands	1	0	0	32	16	1
Built-up areas	51	90	1	852	299	4
Other land	0	0	0	0	0	0
Water bodies	7	4	3	70	51	184

Degraded land productivity during the baseline period was 13.9% for all land cover categories. During the reporting period, these areas accounted for only 2.7% and another 19.3% of land was classified as improving land productivity (Figure 1.4).

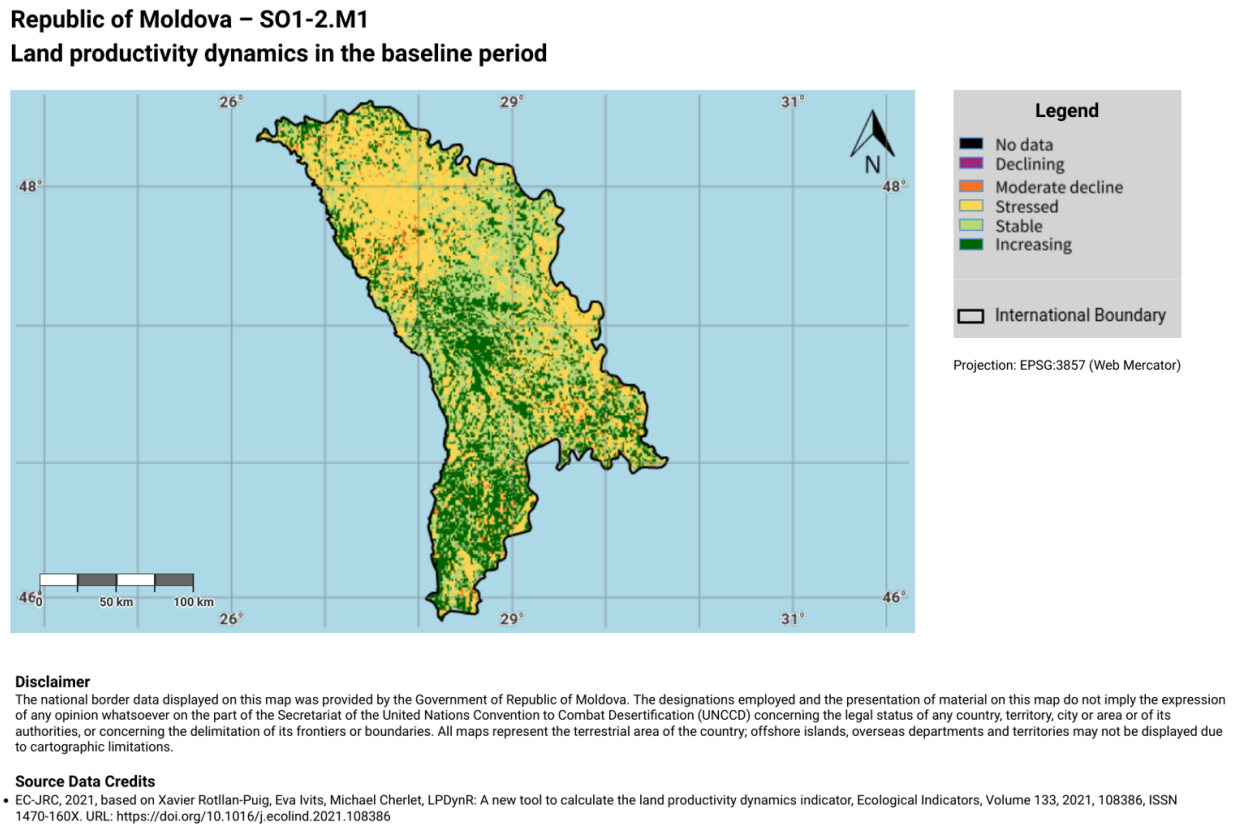


Figure 1.4. Dynamics of land productivity in the baseline period

Regarding the dynamics of land productivity for the baseline period, it can be seen that lands under stress have a higher share of area in the northern half of the country (Balți Steppe and Middle Prut Valley), as well as in Transnistria. In the Codri region and in the south of the Republic of Moldova there is even an increase in labour productivity against the background of general stability.

Table 1.8. SO1-2.T2: National estimates of land productivity dynamics (in km²) within each land cover class for the reporting period

Land cover class (km²)	Degrading (km²)	Moderate decline (km²)	Stressed (km²)	Stable (km²)	Improving (km²)	No data (km²)
Forested areas	6	49	0	2164	303	7
Grasslands	1	5	0	94	23	1
Agricultural land	82	723	2	21531	5628	64
Wetlands	1	7	0	37	6	5
Built-up areas	2	15	3	1 700	379	7
Other land	0	0	0	0	0	0
Water bodies	1	5	3	104	22	179

Table 1.9. SO1-2.T3: National estimates of land productivity dynamics for areas where land conversion to a new land cover class has occurred (in km²) for the baseline period

Land conversion		Dynamics of net land productivity (km²) for the baseline period					
From	To	Net area change (km²)	Degrading (km²)	Moderate decline (km²)	Stressed (km²)	Stable (km²)	Improving (km²)
Croplands	**Built-up areas**	**805**	**17**	**45**	**0**	**610**	**130**
Croplands	**Forested areas**	**34**	**2**	**2**	**0**	**23**	**8**
Forested areas	**Croplands**	**5**	**1**	**0**	**0**	**3**	**1**
Water bodies	**Wetlands**	**5**	**0**	**0**	**0**	**0**	**1**

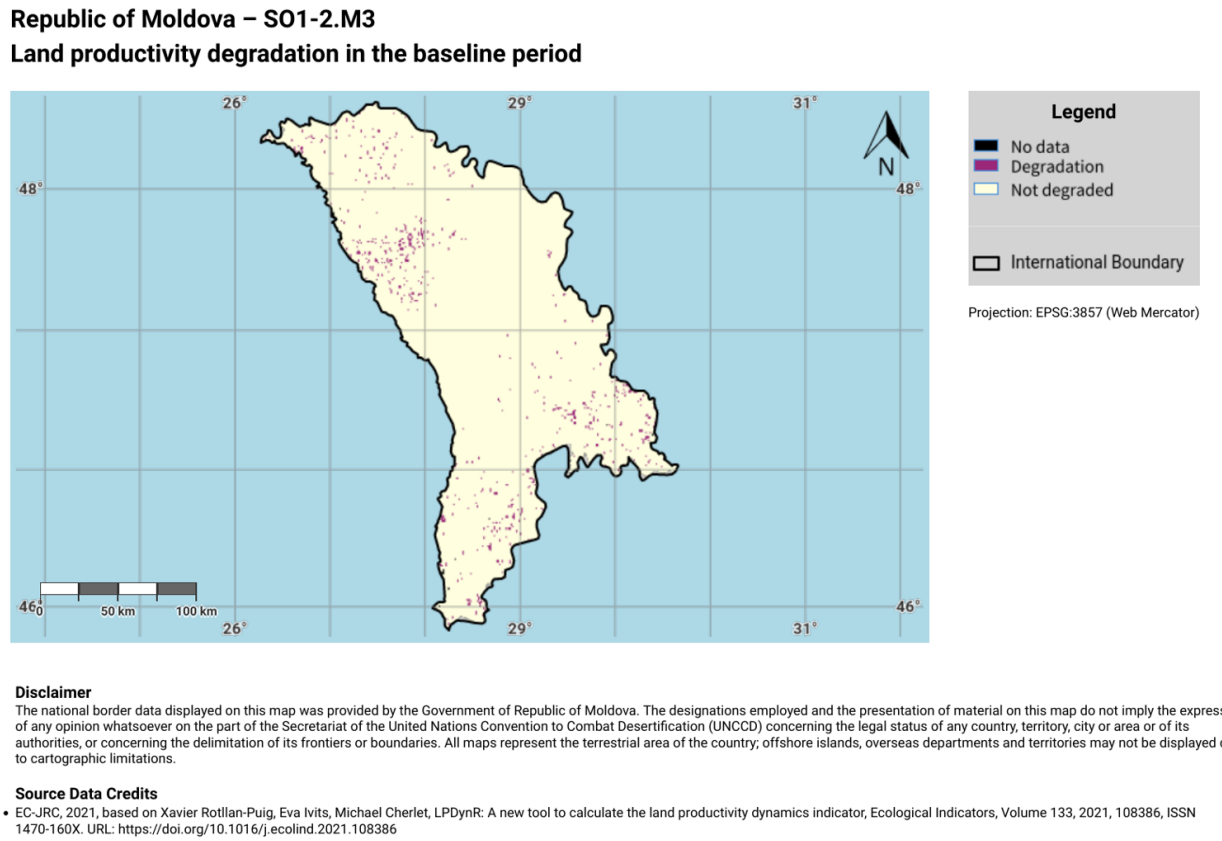


Figure 1.5. Degradation of land productivity in the baseline period

Areas with decreasing productivity have a point distribution, especially in the Middle Prut Valley, North Moldavian Plateau and Bugeac (steppe areas) (Figure 1.5).

Table 1.10. SO1-2.T4: National estimates of land productivity dynamics for areas where land conversion to a new land cover class has occurred (in km²) for the reporting period

From	To	Net area change (km²)	Degrading (km²)	Moderate decline (km²)	Stressed (km²)	Stable (km²)	Improving (km²)
Croplands	**Forested areas**	**33**	**0**	**0**	**0**	**26**	**8**
Forested areas	**Croplands**	**7**	**0**	**1**	**0**	**5**	**1**
Water bodies	**Forested areas**	**5**	**0**	**0**	**0**	**0**	**0**
Water bodies	**Croplands**	**3**	**0**	**0**	**0**	**1**	**0**

Analysing the status and trends of land cover change

Table 1.11. SO1-2.T5: National estimates of land productivity degradation in the baseline period

	Land area (km²)	Share in total area (%)
Area of land with degraded productivity	4566	13.9
Area of land with non-degraded productivity	28231	85.9
Land area without data on land productivity	79	0.2

The quantitative summary of degraded or improved and stable land productivity for the baseline period, presented as total area of degraded land productivity in km² and area of degraded land productivity as a share (%) of total land area, shows the maximum share of land with non-degraded productivity – 85.9%, followed by land with degraded productivity – 13.9%.

The quantitative summary of degraded or improved and stable land productivity for the reporting period, presented as total area of degraded land productivity in km² and area of degraded land productivity as a share (%) of total land area, shows that these values are 77.7% for land with stable productivity and 19.3% for land with improved productivity.

Table 1.12. SO1-2.T6: National estimates of land productivity degradation in the reporting period

	Land area (km²)	Share in total area (%)
Area of land with improved land productivity	6347	19.3
Area of land with stable productivity	25561	77.7
Area of land with degraded productivity	890	2.7
Land area without data on land productivity	83	0.3

1.2.2. Conclusions on the topic

- Regarding the decline in land productivity by land use category, it can be seen that the main reason for the decline is the conversion of agricultural land into built-up land.
- To analyse and report land cover change data, consistency of data (i.e. data derived from the same source using the same processing methodology) over a long period of time is very important, and this is not always ensured, especially at the national scale;
- Validation of national land cover information requires cross-checking in the field and consultation with local experts. These are time-consuming and costly activities.

1.2.3. Recommendations on solutions and necessary actions

Even if the area of land with improved productivity increased in the reporting period compared to the baseline period to 19.3% of the territory, it is necessary to maintain this trend for the next reporting period or even tilt the balance towards the exclusion of land with degraded productivity.

1.3. Trends in carbon stocks above and below ground

1.3.1. Methodologies used

Carbon stocks reflect the integration of multiple processes affecting plant growth as well as decomposition, which together control the gains and losses from terrestrial organic matter pools.

The main output of the reporting process for SO1-3 is a set of officially verified estimates of SOC stock in the top 30 centimetres of soil (in tonnes per hectare) for each of the seven land cover classes and land cover transitions, and their significance in terms of land degradation.

National reporting is facilitated though the provision of default baseline data derived from the International Soil Reference and Information Centre (ISRIC) *SoilGrids250m* dataset, and default estimates of SOC stock changes are derived using a modified Tier 1 Intergovernmental Panel on Climate Change (IPCC) methodology for compiling national greenhouse gas inventories for mineral soils.

Reporting process

Step 1: Select the estimation method Parties may use three methods to determine baseline SOC stocks and estimate changes in SOC stocks. These methods are consistent with the IPCC guidelines and include datasets and processing options with increasing levels of accuracy and complexity.

Step 5: Verify the results The default method draws on data generated from the assessment of land cover change in combination with reference and emission factors obtained from the IPCC default tables corresponding to broad continental land cover types and management regimes.

Step 6: Generate reports Changes in SOC stocks for each land cover change (calculated by Trends.Earth) are reported in tables SO1-3.T2 and SO1-3.T3. Data includes the net area change in km^2 and the initial, final and change in SOC stocks both for the baseline and reporting periods. The results of the SOC degradation analysis based on SOC stock changes is reported in tables SO1-3.T4 and SO1-3.T5. Maps with default or national data representing SOC stocks, SOC stock changes and SOC degradation for the baseline and the reporting period are accessible via the PRAIS 4 platform.

These include:

- SOC stock in the initial year of the baseline period (2000);
- SOC stock in the baseline year (2015);
- SOC stock in the latest reporting year;
- Change in SOC stock in the baseline and reporting periods;
- SOC degradation in the baseline and reporting periods.

SOIL ORGANIC CARBON STOCKS

The results show a decrease in carbon stocks for forests, wetlands and built-up areas between 2001 and 2019 and a slight increase in stocks for agricultural land (Table SO1-3.T1). Forested areas are important sinks of organic carbon, and increasing the area of young forests can significantly enhance these stocks.

Table 1.13. SO1-3.T1: National estimates of soil organic carbon stocks (0-30 cm) for each land cover class (tonnes per hectare)

Year	Forested areas	Grasslands	Agricultural land	Wetlands	Built-up areas	Other categories	Water bodies
2000	-	-	-	-	-	-	-
2001	113	95	90	121	101	105	36
2002	113	95	91	121	85	105	37
2003	113	95	92	121	73	105	37
2004	113	95	93	121	63	105	37
2005	113	95	93	121	63	105	37
2006	113	95	93	121	63	105	36
2007	113	95	93	118	63	105	36
2008	113	95	93	118	63	105	36
2009	113	95	93	115	63	105	36
2010	112	95	93	115	63	105	36
2011	112	95	93	115	63	105	36
2012	112	95	93	111	63	105	37
2013	112	95	93	110	63	105	37
2014	112	95	93	110	62	105	37
2015	113	95	93	112	56	105	36
2016	113	95	93	112	56	105	37
2017	112	95	93	109	56	105	37
2018	112	95	93	108	56	105	37
2019	112	95	93	106	56	105	37

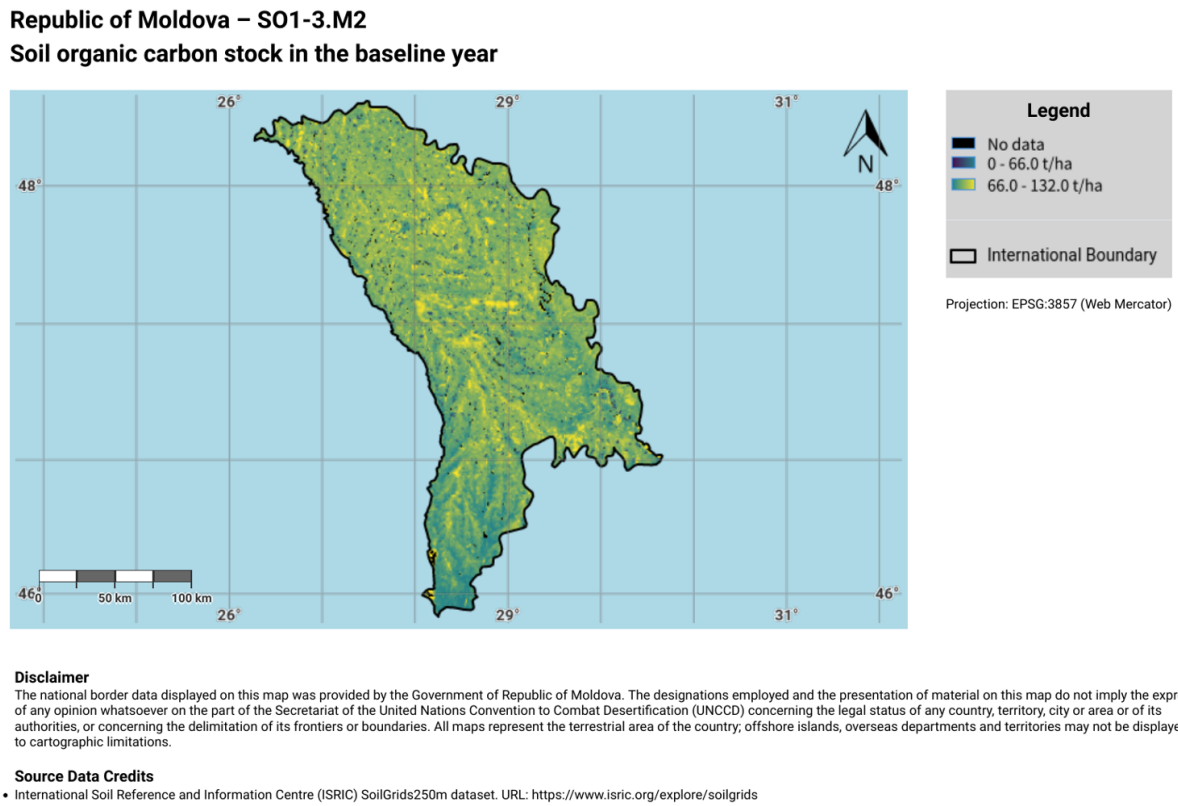


Figure 1.6. Soil carbon stock in the baseline year

Carbon stocks in the baseline year ranged from 66.0 to 132.0 tonnes/ha, which is also reflected in the topoclimatic and soil characteristics of the country (Figure 1.6).

Table 1.14. SO1-3.T2: National estimates of soil organic carbon stock change due to land conversion to a new land cover class in the baseline period

Land conversion		Change in soil organic carbon (SOC) stocks over the baseline period					
From	To	Net land area change (km^2)	Initial SOC stock (tonnes/ha)	Final SOC stock (tonnes/ha)	Total initial SOC stock (tonnes)	Total final SOC stock (tonnes)	Changes in stocks (tonnes)
Agricultural land	Forested areas	34	109.4	119.9	372013	407723	35710
Water bodies	Wetlands	5	39.7	39.7	19829	19829	0
Forested areas	Agricultural land	5	104.0	93.9	52021	46928	-5093
Agricultural land	Built-up areas	805	87.7	37.0	7060121	2982313	-4077808

Table 1.15. SO1-3.T3: National estimates of soil organic carbon stock change due to land conversion to a new land cover class in the reporting period

Land conversion		Change in soil organic carbon (SOC) stocks over the baseline period					
From	To	Net land area change (km^2)	Initial SOC stock (tonnes/ha)	Final SOC stock (tonnes/ ha)	Total initial SOC stock (tonnes)	Total final SOC stock (tonnes)	Changes in stocks (tonnes)
Agricultural land	Forested areas	33	100.4	103.4	331251	341140	9889
Water bodies	Forested areas	5	13.6	13.6	6813	6813	0
Water bodies	Agricultural land	3	34.9	34.9	10478	10478	0
Forested areas	Agricultural land	7	107.1	104.9	74940	73405	-1535

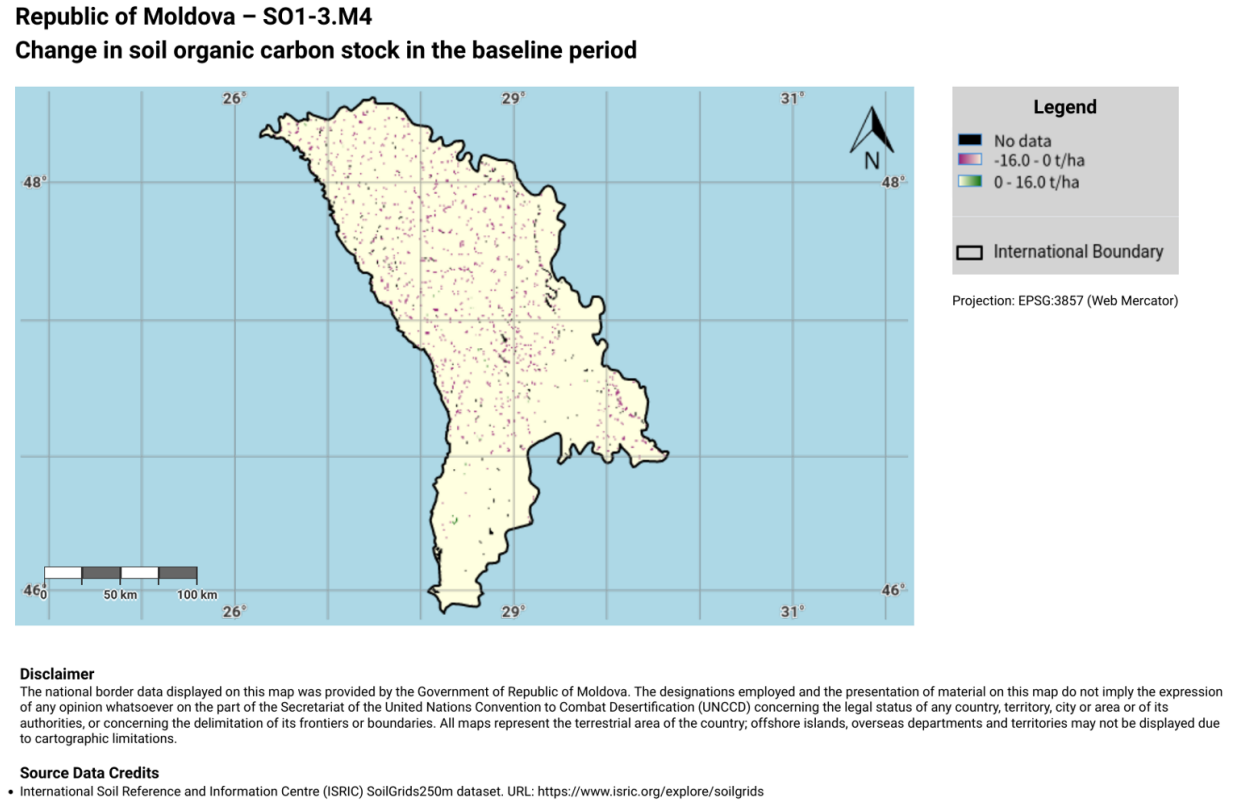


Figure 1.7. Change in soil carbon stocks over the baseline period

The change in carbon stocks over the baseline period shows a predominant stability across the territory, with an increase in stocks when land is converted from agricultural to forested land and a decrease when it is converted back (Figure 1.7).

DEGRADATION OF SOIL ORGANIC CARBON STOCK

Table 1.16. SO1-3.T4: National estimates of soil organic carbon stock degradation over the baseline period

	Land area (km^2)	Share in total area (%)
Area of land with degraded SOC	870	2 .6
Area of land with non-degraded SOC	31 954	97 .2
Land area with no SOC data	52	0 .2

Quantitative summary of land degraded or not degraded due to changes in SOC during the baseline period, presented as total area of degraded SOC in km^2 and area of degraded SOC as a share (%) of total land area.

Table 1.17. SO1-3.T5: National estimates of SOC stock depletion over the reporting period

	Land area (km^2)	Share in total area (%)
Land area with improved SOC	0	0.0
Land area with stable SOC	31955	97.1
Area of land with degraded SOC	871	2.6
Land area with no SOC data	56	0.2

Quantitative summary of land degraded, improved or stable as a result of changes in SOC during the reporting period, presented as total area of degraded SOC in km^2 and area of degraded SOC as a share (%) of total land area.

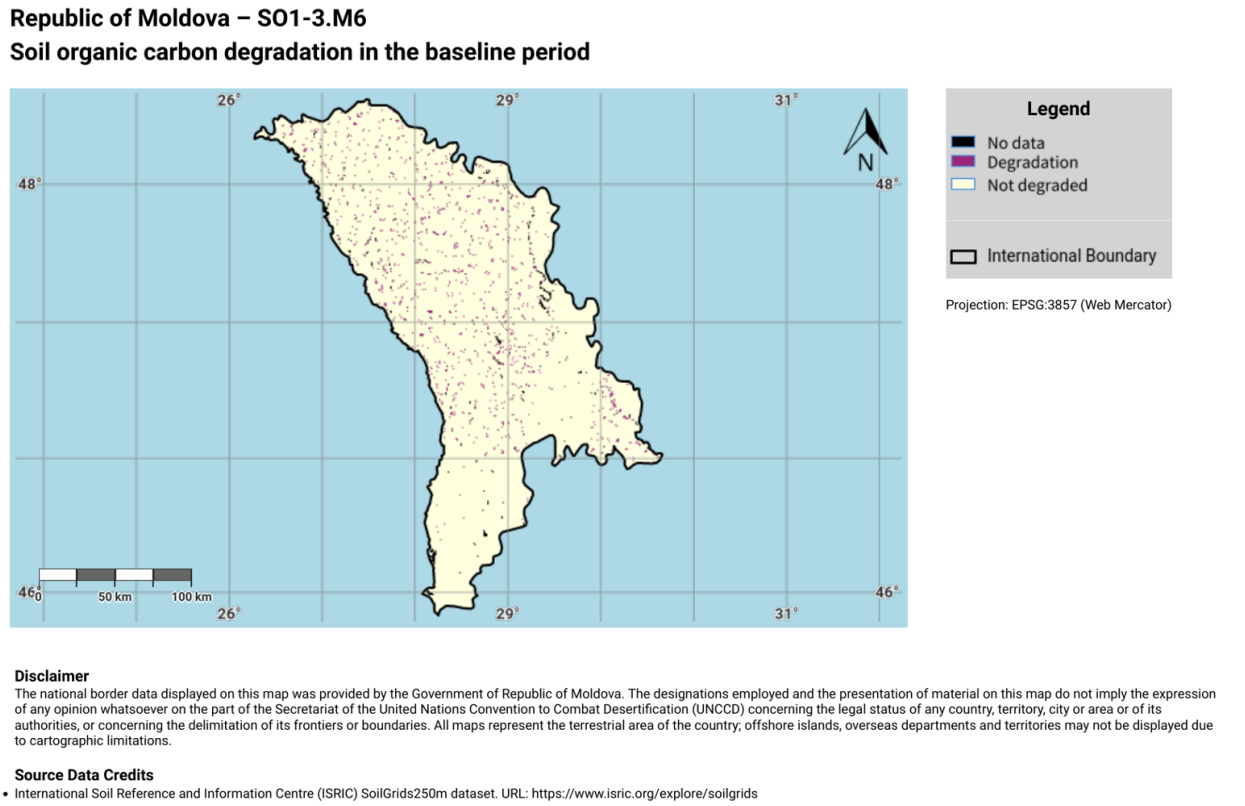


Figure 1.8. Degradation of organic carbon in soil during the baseline period

Degradation of soil C stocks during the baseline period has a spatially uniform and point distribution, accounting for 2.6% of the land area (Figure 1.8).

Moldova's historical responsibility for greenhouse gas emissions is low. In 2020, our country generated about 13.66 Mt of CO_2 equivalent, which is less than 0.03% of the world's total emissions. Total and net emissions per capita were almost double the global average (4.4 tonnes CO_2-equivalent per capita vs. 6.4 tonnes CO_2-equivalent per capita).

Moldova also has historically low emissions since 1990, below 0.05% of global emissions. For example, between 1990 and 2019, total national GHG (greenhouse gas) emissions in the Republic of Moldova decreased by about 69.6%, which is significantly higher than most highly industrialised or transition economies.

Over the period 1990-2020, total GHG emissions have shown a decreasing trend, with emissions from the energy sector decreasing by about 74.2%, those from the industrial sector by about 37.8%, and those from the agricultural sector by 69.5%.

The energy sector is the largest source of total direct greenhouse gas emissions in the country, with its share varying between 81.8 and 69.9 per cent between 1990 and 2020.

With the exception of 2019, some land categories in RM were a source of net carbon sequestration between 1990 and 2020. In 2019, this sector was a net source of emissions at the national level.

Over the period 1990-2020, there was a downward trend in net CO_2 sequestration/emission, which decreased by about 99.8%: from -1.6575 Mt CO_2-equivalent in 1990 to -0.0035 Mt CO_2-equivalent in 2020.

This is mainly due to changes in land use and management practices on agricultural land that have led to a significant reduction in organic C stocks in soils under agricultural use, resulting in a change in the humus balance from positive to negative and/or deeply negative.

This process has also been influenced by changes in forest management and use, such as an increase in authorised timber harvesting, a significant increase in illegal logging, increased conversion of agricultural land to forest land, etc.

In 2020, forests were the main source of CO_2 uptake, accounting for 43.1% (35.4% in 1990), followed by grasslands at about 5.1% (16.7% in 1990), and wetlands at about 1.9% (7.7% in 1990). Cropland is a net source of emissions, with a share of 37.2% (32.9% in 1990), followed by degraded land with a share of about 7.5% (2.1% in 1990) and settlements with a share of about 4.4% (3.5% in 1990).

1.3.2. Conclusions on the topic

The change in carbon stocks over the baseline period indicates the prevalence of stability in the area, with stocks increasing when land is converted from agricultural land to forested land and decreasing when it is converted back.

1.3.3. Recommendations on solutions and necessary actions

Forested areas are important sinks of organic carbon, and their expansion could substantially increase these stocks.

1.4. Proportion of land that is degraded over total land area (Sustainable Development Goal Indicator 15.3.1)

1.4.1. Methodologies used

Using the three indicators SO1-1, SO1-2 and SO1-3, UNCCD reporting estimates the proportion of degraded land over total land area, which is also SDG indicator 15.3.1 and the only indicator used to track progress towards Target 15.3. SDG indicator 15.3.1 is reported as a single figure expressed in km^2 quantifying the area of land that is degraded as a proportion of total land area, which is defined as the total surface area of a country excluding the area covered by inland waters, like major rivers and lakes. UNCCD facilitates reporting on SDG indicator 15.3.1 by providing pre-filled data in the PRAIS 4 platform with values derived from default datasets.

Parties are also encouraged to identify 'hotspots'and 'brightspots'as areas experiencing the most evident and dramatic changes in (i) land degradation; and (ii) improvement, respectively.

REPORTING PROCESS

Step 2. Identify false positives and false negatives. There is the option of identifying areas of *'false positive'* degradation, where an area is incorrectly identified as not being degraded even though the change in land condition is considered sufficiently negative to qualify it as degraded in the context of SDG indicator 15.3.1; and *'false negative'* degradation, where an area is incorrectly identified as being degraded.

Step 3. Assess hotspots and brightspots. UNCCD encourages Parties to signal areas experiencing the most evident and dramatic change. These are defined as:

- hotspots: areas that are highly vulnerable to degradation in the absence of urgent remediation activities;
- brightspots: areas that do not exhibit any signs of degradation, or which have been remediated from a degraded state by implementing appropriate remediation activities or through land planning processes to prevent degradation.

Step 4. Generate reports Default maps or maps generated in Trends.Earth using national data representing land degradation for the baseline/reporting period are made available in the PRAIS 4 platform. More specifically, the following maps will be available online:

- Proportion of land that is degraded over total land area (SDG indicator 15.3.1) in the baseline period;
- Proportion of land that is degraded over total land area (SDG indicator 15.3.1) in the reporting period;
- Degradation hotspots (for countries that provide spatial data in the PRAIS 4 platform);
- Improvement brightspots (for countries that provide spatial data in the PRAIS 4 platform).

ANALYSING THE STATUS AND TRENDS OF LAND COVER CHANGE

SO1-4 Proportion of land that is degraded over total land area (SDG indicator 15.3.1)

Table 1.18. SO1-4.T1: National estimates of the total area of degraded land (in km²) and the proportion of degraded land in relation to total land area

	Total area of degraded land (km²)	Proportion of degraded land over total land area (%)
Reference period	5366	16.3
Reporting period	1769	5.4
Changes in degraded land area	-3597	

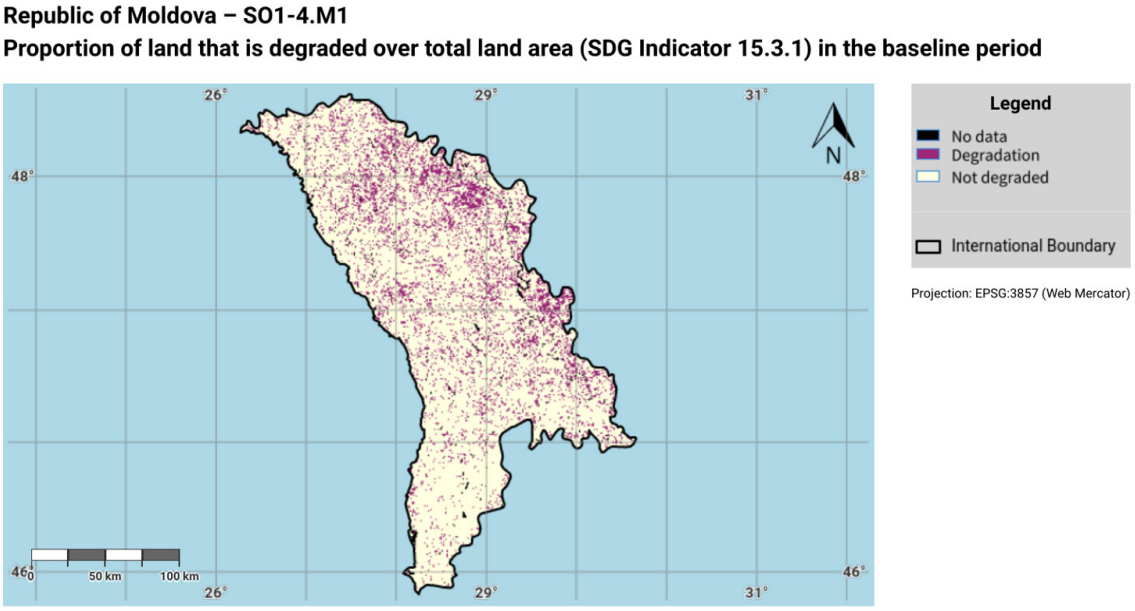


Figure 1.9. Share of degraded lands in the baseline period

The proportion of degraded lands over total land area in the baseline period was 16.3%, decreasing to 5.4% in the reporting period, which speaks in favour of an improved situation.

In spatial terms, the share of degraded lands is higher on the Nistru Plateau, in Transnistria and on the Balți Steppe (Figure 1.9), which together dominate the other regions.

1.4.2. Conclusions on the topic

More forests, grasslands and wetlands are needed, as well as tighter controls on the expansion of land used for construction.

1.4.3. Recommendations on solutions and necessary actions

It is recommended that land cover maps for the Republic of Moldova be produced and used instead of default data.

It is recommended to develop an own methodology for quantifying soil C stocks.

In the period between reports, continuous expert input is required to prepare the necessary data, review the methodology, etc. In this respect, a responsible person/focal point should be appointed in the implementing unit to monitor the flow of data and changes in methodology.

1.5. Conclusions and final recommendations for SO1. Voluntary targets

1.5.1. Conclusions

Overall, forested areas, wetlands and built-up areas increased between 2001 and 2019 at the expense of agricultural land.

The assessment of land cover degradation shows the share of degraded land at 2.4% in the baseline period and improvement of land cover degradation by 0.1% in the reporting period. One of the key processes is urbanisation, where agricultural land is converted to built-up areas.

The dynamics of productivity for different land cover categories shows a high proportion of declining and moderately declining agricultural land during the baseline period and a shift of some agricultural land towards stable or improved land.

There is also an overall decrease in the areas in the categories of degraded lands and moderately degraded lands. Areas with degraded land productivity for the baseline period totalled 13.9% for all land cover categories. During the reporting period, these areas accounted for only 2.7% and another 19.3% of land was classified as improving land productivity.

The results show a decrease in carbon stocks for forests, wetlands and built-up areas between 2001 and 2019 and a slight increase in stocks for agricultural land.

The proportion of degraded land over total land area in the baseline period was 16.3%, decreasing to 5.4% in the reporting period, which speaks in favour of improvement of the situation.

1.5.2. Recommendations

The following actions are necessary to remedy the situation in terms of *soil* quality improvement:

- proper erosion control and hydrological organisation of agricultural landscapes, taking into account the suitability of the land for different uses;
- creation of a compulsory system of organic fertilisation of soils through the use of green fertilisers; use of organic residues of main agricultural crops;
- introduction of crop rotation using perennial and annual legumes, reduction of the share of tilled crops;
- ecological reconstruction of degraded lands subject to landslides and used for mining;
- introduction of crop rotations on slopes steeper than 5% with only frequently grown crops (cereals, annual legumes, perennial grasses);
- harmless (balanced, minimum necessary) chemical fertilisation of agricultural crops, primarily with phosphorus fertilisers, etc.

The following measures are needed to improve the condition of *forest ecosystems and lands*:

- integrating sustainable development and climate change adaptation into the forest sector by designing stable and diversified forests;
- decentralisation of the work of public authorities to further improve the level of forest management and provide real support to different forms of forest ownership;
- delineation of zones of stability and resilience of ecosystems, their flora and fauna to climate change;
- ecological reconstruction of unsuitable and climatically vulnerable stands as a measure to increase the ecological-protective and bioproduction potential of existing natural and/or artificial forests;
- maintaining and restoring wetlands in forested areas to conserve biodiversity and protect against climate change;
- increasing the area of forested areas and protective forest cover, which will make a significant contribution to reducing soil erosion and landslides, reducing water runoff, protecting agricultural crops and solving other socio-economic problems;
- planting species that will capitalise on the new environmental conditions and achieve higher accumulation of total biomass throughout the production cycle (depending on the region and species (willow, linden, poplar, etc.), accumulation can be 20-40% higher than under 'normal' environmental conditions), which directly affects the carbon sequestration potential;
- reducing emissions from deforestation and forest degradation (REDD+ program);
- increasing the area of grasslands and wetlands;
- addressing the problems of personnel training and professional development by strengthening the system of training, advanced training, retraining and certification of forestry workers;
- development and implementation of forest management plans, irrespective of the nature of ownership, with emphasis on land and soil protection functions;
- ensuring strict control over the expansion of land used for infrastructure and construction.

1.5.3. Voluntary targets

Voluntary targets by 2030 to reduce identified risks and vulnerabilities

The main policy documents containing activities related to the agricultural sector and environmental protection focused on restoration of damaged ecosystems, reduction of greenhouse gas emissions, combating desertification/land degradation, promotion of sustainable management are:

- Environmental Strategy 2014-2023 and Action Plan for its implementation (GD 301/2014);
- Low Emission Development Strategy of the Republic of Moldova to 2030 and Action Plan for its implementation (GD 1470/2016);
- Strategy for the Development of Rural Extension Services 2012-2022 (GD 486/2012);
- National Strategy for Regional Development 2016-2022 (Law 239/2016);
- Waste Management Strategy in the Republic of Moldova for 2013-2027 (GD 248/2013);
- Food Safety Strategy 2018-2022 (GD 1150/2017);
- National Forest Expansion and Reforestation Program for the period 2023-2032, including the Action Plan 2023-2027 (GD 55/2023).

The voluntary targets with major impact identified based on the relevant policy documents for the *agricultural and environmental sectors* are mainly the following:

- improvement of 880 thousand hectares of eroded lands and 21.6 thousand hectares of landslide-prone lands;
- restoration of about 150 thousand hectares of degraded wetlands;
- application of no-till[2] conservation tillage system on 320 thousand ha/year;
- application of the 'reduced-till'[3] conservation system on 320 thousand ha/year;
- storage of manure on communal platforms or in individual storages (38% of the total 16.62 million tonnes of manure)[4];
- reclamation of at least 50 per cent of non-compliant landfills.

The following are ***voluntary targets*** that have a major impact on the *land use, land use change and forestry* sector:

- increasing the area covered by forest vegetation to at least 15% of the country's land area;
- implementation of a set of measures for quantitative and qualitative improvement aimed at increasing the area of land covered with forest vegetation, increasing the carbon sequestration potential and enhancing the ecological-protective and bioproduction potential of existing forests, including afforestation of protection zones and strips for rivers and water bodies through the creation/restoration of 30.4 thousand ha of protective forest belts for rivers and water bodies;
- planting of energy forest plantations of high-growth rate species managed in small production cycles (10-15 years) on an area of about 10.0 thousand ha;
- increasing the productive potential of forests by 10% of the existing potential;
- creation of new forest plantations on an area of 110 thousand ha;
- restoration/rehabilitation of existing degraded and unsuitable forest plantations on an area of 35 thousand ha;
- reduction of forest fragmentation index by 0.75 units (which means increased compactness) by improving ecological connectivity with biodiversity habitats;
- reduction of the area of degraded lands by 45 thousand ha through afforestation;
- strengthening of the community forestry sector through expansion of afforested areas and rehabilitation of the existing ones, training of staff and development of forest management plans (85,000 ha);
- strengthening of the private forestry sector through expansion of forested areas, staff training and development of forest management plans;
- reduction of severely eroded lands by 15,000 ha through afforestation;
- strengthening of the hydrological framework through afforestation of 15,000 ha of riparian strips;
- mitigation of soil erosion processes and protection of about 350,000 ha of agricultural land through creation/restoration of 10,000 forest protection buffers for agricultural fields;
- strengthening of capacity to reduce the frequency of forest fires through the development of fire management plans and the creation of firefighting infrastructure in new or restored forests (equipment, water sources, mineralised strips, watch and observation towers, etc.) – 145,000 ha;
- capacity building in grassland management through implementation of practical measures on creation and restoration of forest-pasture systems – 5 thousand ha.

2 No-till is a conservation tillage method where sowing is done directly into the stubble. The main working unit is the seed drill. The main element of the no-till planter is the drill. The topsoil gradually becomes biogenic, well-structured, loosened, an aero-hydro and nutrient regime favourable for plants is formed, and their resistance to drought increases. CO_2 emissions are reduced by 3.8 tonnes/ha/year.

3 The reduced tillage method involves returning crop residues to the soil, partially retaining them as mulch on the soil surface. This method is improved by using peas as a rotation crop for green manure. CO_2 emissions will be reduced by 4.6 tonnes/ha/year.

4 Manure stored on impermeable platforms can be separated. For proper decomposition, it is covered with polythene sheeting to prevent leaching of nutrients and reduce volatilisation of CH_4 and NH_3. This will limit the release of nitrates and nitrites to soil and water, reduce greenhouse gas emissions and produce quality organic fertiliser.

SPECIFIC OBJECTIVE 2 TO IMPROVE THE LIVING CONDITIONS OF AFFECTED POPULATION

2.1. Trends in population living below the relative poverty line and/or income inequality in affected areas

2.1.1. Methodologies used

Indicator SO 2-1 estimates the well-being of populations in monetary terms. Two metrics are used for this purpose:

- Proportion of the population below the international poverty line, or
- Income inequality (Gini Index).

These metrics can be used interchangeably according to country-specific conditions. Income inequality is a useful metric for both low-income and middle-income countries as it estimates the extent of wealth distribution in a region. It is estimated through the Gini index. The Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

The reporting process is described below.

Step 1: Choose the most suitable metric. The most suitable metric that represents the well-being of the country's population is selected.

Step 2: Identify the relevant dataset. Income inequality (Gini index) data is pre-filled from the World Bank database. National data may also be used. The Gini index was calculated and provided by the National Bureau of Statistics (NBS) of the Republic of Moldova.

Step 3: Report national annual values of the chosen metric and interpret the data. If an alternative national data source is used, the relevant national annual values may be entered into Tables SO2-1.T1 or SO2-1.T2, according to the chosen metric.

Step 4: Verify the results. The reliability of the estimates from global data sources requires inputs from national experts to detect and highlight situations where the confidence level of the obtained results might be low. This input would contribute to a qualitative assessment of the reliability of the estimates.

Step 5: Generate reports. Once verified, the estimates of the proportion of population below the international poverty line or income inequality should be officially submitted to the UNCCD. Observed changes and their interpretation may be described in the 'Qualitative Assessment' table of the PRAIS 4 platform.

Table 2.1. SO2-1.T2: National estimates of income inequality (Gini index)

Year	Income inequality (Gini index)	Year	Income inequality (Gini index)	Year	Income inequality (Gini index)
2000	36.4	2007	34.4	2014	32.6
2001	**38**	2008	34.7	2015	32.4
2002	35.8	2009	32.9	2016	33.1
2003	34.9	2010	32.1	2017	31.7
2004	35	2011	30.6	2018	30.5
2005	36.6	2012	29.2	2019	31.5
2006	35.4	2013	28.5	2020	32.3

Data source – National Bureau of Statistics[5]

As of 2019, NBS data are not comparable to previous years because the survey methodology has changed.

Reference metadata:

- Income and expenses of the population. Household Budget Survey – for the time series from 2019 onwards / https://statistica.gov.md/files/files/Metadate/CBGC.pdf;
- Income and expenses of the population. Household Budget Survey – for the time series 2006-2018/ https://statistica.gov.md/files/files/Metadate/CBGC_2006-2018.pdf.
- Population data were used for the calculations for:
- 2000-2013 – the number of stable population. Stable population – the number of people permanently residing in a given territory, including those temporarily absent. The stable population is based on the 1989 census.
- 2014-2020 – the number of the population of habitual residence. Habitual residence refers to the place where a person has predominantly resided during the last 12 months, irrespective of temporary absences (for purposes of recreation, holidays, visits to relatives and friends, business, medical treatment, religious pilgrimage, etc.).

The estimate of the habitual resident population is based on the adjusted habitual resident population of the 2014 Population and Housing Census, to which the number of live births was added, from which the number of deaths was subtracted (natural increase) and migration growth (net migration) was taken into account.

Reference metadata:

https://statistica.gov.md/ro/glossary?query=&indicators%5B%5D=25&letters%5B%5D=p

https://statistica.gov.md/files/files/Metadate/alte/Precizari_metodologice_estimarea_numarului_PRO.pdf

FACTUAL ANALYSIS OF THE SITUATION AND TRENDS IN SOCIAL WELFARE AND POPULATION GROWTH/INCOME INEQUALITY

Income level is one of the elements that determine the quality of life. Higher incomes allow people to have access to more goods and services, accumulate greater savings that help them cushion shocks, make investments and finance expenditures after retirement.

Between 2015 and 2021, the average annual GDP growth rate was around 3.1%, slowing down from the 2001-2010 period when it was above 5%. According to the World Bank, GDP per capita, expressed in constant prices, increased from USD 2,457 in 2015 to about USD 4,921 in 2021.

The pronounced fluctuations in GDP reflect shocks in recent years, such as droughts in 2003, 2007, 2009, 2012, 2015 and 2020, the global crisis in 2009, the banking crisis in 2015 and the COVID-19 pandemic in 2020. As a result, the modest economic performance has clearly taken a toll on people's incomes. Average wages are only a fifth of the average for Central and Eastern Europe, as is labour productivity. As a result, people are running huge deficits, consuming more than they earn. The duration of the economically active life is only 21 years, a much shorter period compared to other countries, and this results in a deficit of tens of billions of lei: MDL 42 billion for women and MDL 18 billion for men, according to 2018 estimates.

In Moldova, the low unemployment rate (3.2% in 2021) hides the extremely low level of economic activity and employment of the population – only 39.8% of the population was employed in 2021 (over 65% in the EU). The level of economic inactivity is twice as high as in the EU, especially among young people who are unemployed and not in education or training, also known as NEETs. The NEET rate among young people aged 15-29 in our country reached 26.4% in 2021 (EU: 13.1% in 2021), with a female predominance of 60%. Combined with demographic factors, low fertility rates and migration abroad, the share of the working-age population will decline further, contributing to a high dependency ratio and additional pressure on the social protection system[6].

The level of socio-economic inequalities in the RM tend to decrease following the increase in the population income. This is due particularly to labour migration, which brought a significant volume of remittances into the national economy every year.

5 current demographic statistics/https://statistica.gov.md/files/files/Metadate/Populatia.pdfsocial statistics (Household Budget Survey (HBS) – a selective survey aimed at determining the standard of living of the population by income, expenditures, consumption, living conditions and other indicators) https://statistica.gov.md/ro/glossary?query=&indicators%5B%5D=3&letters%5B%5D=c

6 https://gov.md/sites/ default/files/ document/attachments/snd2030_obiectiv1.pdf

Thus, on one hand, the income of the population from the most vulnerable group increased and on the other hand, the number of households with precarious economic situation decreased. Nonetheless, Covid-19 pandemic showed the uncertainty of the income of some groups of people, who lost a part of their income or even their job due to lockdown.

Over the past 10 years, the level of inequality has not changed essentially in most of the Central and Eastern European countries. The RM was the only country in the region that registered a significant positive performance at this chapter. Even so, the value of GINI coefficient is among the lowest in the Republic of Moldova, our country being outrun only by several countries such as Czech Republic, Poland and Slovenia. However these comparisons should be analysed carefully as the income of the national population cannot be compared with those from other countries.

In 2013, the Gini coefficient for RM approached the critical value of 28.5, which classifies RM as a country with a moderate level of social inequality.

After some slight improvement, inequality levels have started to rise again since 2018.

2.1.2. Conclusions

Social inequality remains one of Moldova's main problems. Income distribution is an important factor in studying the well-being of the population, but it is not the only factor that determines social stratification in a country or region. The ratio between the population's income and the subsistence minimum in the Republic of Moldova has identified the most vulnerable social group – pensioners, whose income is below the average subsistence minimum established by law.

2.1.3. Recommendations

- Minimise the impact of inflation on people's incomes and thus their purchasing power and welfare through mechanisms to compensate vulnerable groups for price increases in services and basic foodstuffs.
- Incentivise companies to provide non-discriminatory access for all citizens, including vulnerable groups: persons with disabilities, women, youth, Roma people, rural residents and older persons.
- Empower employees to protect their rights and negotiate with employers to achieve better working conditions and avoid abuses by employers.
- Develop private and public mechanisms for continuous training and retraining to enable people to change jobs and/or acquire new qualifications as quickly as possible.
- Stimulate rural employment by improving access to nearby cities and towns, in particular by developing a network of local roads and public transport.
- Eliminate forced labour, human trafficking and child labour[7].

2.2. Trends in access to safe drinking water in affected areas

2.2.1. Methodologies used

Access to water is key to child survival, maternal and child health, family well-being and economic productivity.

Consequently, the trend towards improved access to safe drinking water will improve the living conditions of the affected population. The indicator is disaggregated by urban and rural population and expressed as a percentage.

REPORTING PROCESS:

Step 1: Identify the relevant dataset. The default data for this indicator is pre-filled from the SDG database (SDG indicator 6.1.1). Parties may also use national data provided that it meets the required specifications. The proportion of the population with access to quality drinking water sources, by area of residence, has been calculated and provided by the NBS of the RM.

Step 2: Report national annual values and interpret the data. An alternative source of national data was selected and entered into Table SO2-2.T1.

7 https://gov.md/sites/default/files/document/attachments/snd2030_obiectiv1.pdf

Step 3: Verify the results. The reliability of the estimates from global data sources requires inputs from national experts to detect and highlight situations where the confidence level of the obtained results might be low.

Step 4: Generate reports. Disaggregated data on this indicator (urban and rural areas) can be useful in identifying where the most significant hotspots/brightspots are located. Optionally, parties may include additional information to describe specific country situations and provide more detail on the interpretation of the data.

WORKS PERFORMED

Share of population using safe drinking water supply services

Table 2.2. SO2-2.T1: Estimates of the proportion of the population using safe drinking water services

Year	Urban (%)	Rural (%)	Total %	Year	Urban (%)	Rural (%)	Total %
2000	77	1.5	31.8	**2011**	90.4	35	59.9
2001	77	2.2	32.3	**2012**	89.9	36.8	60.5
2002	77.4	2.1	31.1	**2013**	89.4	35.7	60.1
2003	75.7	2.7	31.6	**2014**	89.8	37.6	60.5
2004	76.6	3.7	32.7	**2015**	90.7	42.8	63.5
2005	79.5	4.6	34.4	**2016**	92	43.6	64
2006	83.4	12	42.7	**2017**	91.8	50	67.9
2007	82.2	13	43	**2018**	93.2	51.7	69.2
2008	82.2	6.1	39.6	**2019**	93.2	52.5	68.8
2009	82.5	9.3	41.6	**2020**	95.9	54.4	71.2
2010	87.6	26.1	534				

Inserted here are the annual national values of the proportion of the population using safe drinking water services provided by the NBS of RM. The indicator is expressed as a percentage of urban, rural and total population.

QUALITATIVE ASSESSMENT

Table 2.3. SO2-2.T2: Interpretation of the indicator

Change in indicator	Comments
Growth	During the reporting period, drinking water distribution networks were established, especially in rural areas.

Inserted here are the national figures provided by the NBS of RM.

FACTUAL SITUATION ANALYSIS ON TRENDS IN ACCESS TO SAFE DRINKING WATER

Safe drinking water is integral to public health, and access to good quality and sufficient water provides greater protection for public health.

Moldova is highly dependent on surface water resources. About 85% of water intake is from surface water, mainly from the Nistru and Prut rivers. During the transition period from 1990 to 2000, water abstraction decreased significantly (by 75%). Since then, annual water withdrawal has had a steady trend and averages 725 million m^3 per year.

However, the uncertainty of the data, especially for self abstraction (groundwater and surface water), is very high and will require a strengthened program of monitoring and accounting of water supply and use.

The RM has significant groundwater reserves, which are accessed through wells and boreholes. Groundwater is especially important in rural areas where centralised water supply systems are limited.

The country experiences slightly higher water stress (the average annual water use index (WUI) is about 13% compared to neighbouring countries (SDG 6.4.2)).

The number of homes connected to water and sewerage has doubled in the last 20 years, but excluding new homes, progress is much more modest.

According to the 2020 Household Budget Survey, 98.5% of the urban population and 72.8% of the rural population have access to water supply, and about 88.5% of the urban population (public or own networks) and 45.6% of the rural population (own networks) have access to hot water. In addition, 87% of urban households have an indoor toilet, while only 35% of rural households have an indoor toilet.

Ensuring water quality is a constant concern in Moldova. Water treatment plants play a critical role in providing safe drinking water to the public, but maintenance and upgrading of the infrastructure is necessary to ensure that quality standards are met at all times.

2.2.2. Conclusions

It is important to note that despite the efforts made to improve water access and quality in RM, problems such as aging infrastructure, water pollution and limited resources still exist. The Government, together with international organisations, continues to work on improving water management and promoting sustainable practices to ensure better access to safe water for all Moldovan citizens.

The worst situation is in rural areas, where the main source of water is wells, which by their chemical composition do not meet sanitary standards.

2.2.3. Recommendations

- Ensure public co-financing of decentralised and semi-centralised sewerage systems for sewerage and wastewater treatment in small settlements;
- Strengthen the capacity of 'Apa-Canal' operators to provide water supply and sewerage services at the regional level based on inter-community cooperation;
- Develop and implement rainwater harvesting and utilisation solutions;
- Set water quality targets and improve wastewater and domestic sewage treatment.

2.3. Trends population exposure to land degradation disaggregated by sex

2.3.1. Methodologies used

The indicator estimates the proportion of populations exposed to land degradation, disaggregated by sex, as a first step towards addressing the gender gap in land degradation data in the UNCCD reporting framework. The methodology uses the spatial distribution of the population or sub-population group (i.e., by sex) to establish its exposure to land degradation, as determined by indicator SO1-4 (i.e., SDG Indicator 15.3.1).

REPORTING PROCESS

Step 1: Select the population dataset. Suitable data for the calculation of indicator SO 2-3 is a sex-disaggregated gridded count of the human population, or a georeferenced set of sub-national data that covers the full extent of the country. It must represent the number of male and female individuals per grid cell, ideally annually, in the time period in question (i.e., the date timestamp should be at least one of the years within the baseline and reporting period). Among the publicly available population datasets at the global scale, the WorldPop dataset is used by default by the UNCCD for calculating indicator SO2-3 and provided to Parties in Trends.Earth.

Step 4: Qualitatively assess the results. It is important to note that changes in the proportion of population exposure to land degradation may not only be due to the expansion of land degradation but also to population growth, among other factors.

Step 5: Verify the results. The reliability of the estimates from global data sources requires inputs from national experts to identify and highlight situations where the confidence level of the obtained results might be low.

Step 6: Generate reports. Once verified by the Parties, the estimates of the female, male and total population exposed to land degradation should be officially submitted to the UNCCD.

Default maps or maps generated in Trends.Earth using national data representing population exposure to land degradation by sex are made available in the PRAIS 4 platform. More specifically, the following maps will be available online:

- Total population exposed to land degradation;
- Female population exposed to land degradation;
- Male population exposed to land degradation.

Share of population exposed to land degradation disaggregated by gender

Table 2.4. SO2-3.T1: National estimates of the proportion of the population exposed to land degradation disaggregated by sex

Time period	Population exposed (№)	Population exposed (%)	Women exposed (№)	Women exposed (№)	Men exposed (№)	Men exposed (%)
Reference period	704780	18.3	364929	18.6	339851	18.7
Reporting period	345828	9.3	181139	9.3	164689	9.3

ANALYSIS OF THE SITUATION AND TRENDS IN THE PROPORTION OF THE POPULATION EXPOSED TO LAND DEGRADATION

Although Moldova has made a number of international and national commitments to implement the UNCCD, Moldovan society remains vulnerable to drought and land degradation. The country's agricultural sector is increasingly affected by extreme droughts that contribute to land degradation. For example, 7 of the 10 hottest years in Moldova's history occurred in the last two decades.

During these droughts, crops failed, leading to food shortages and rising food prices, causing hunger and malnutrition, especially among vulnerable groups such as children, the elderly and the poor.

The drought has also led to a shortage of water for domestic use, causing health and sanitation problems. In addition, farmers using rainfed agriculture have faced declining incomes and even bankruptcy due to crop failure, leading to increased rural-urban migration and unemployment.

Moldova is exposed to a number of natural hazards and climate risks and their impact disproportionately affects the country's population (Figure 2.1), the poor and vulnerable groups. About 30% of the country's population, especially the rural population, which is totally dependent on agricultural activities, have been severely affected by the droughts of recent years.

Moldova needs to implement a comprehensive reform program to improve preparedness for drought risk, invest in mitigation and further strengthen disaster response.

2.4. Conclusions and recommendations SO2. Voluntary targets

2.4.1. Conclusions

The Gini index, which reflects trends in social welfare and population growth/income inequality, shows remarkable stability between 2000 and 2020, ranging from 31.5 to 38.

Trends in access to safe drinking water and the proportion of the population with access to safe water sources are generally increasing. The proportion of the population with access to quality water is estimated to be between 31.8% and 71.2%.

As for the urban population, this share increased from 77% to 95.9%. Only 54.4% of the urban population is provided with quality drinking water, but there is an increase compared to 2000.

As for the proportion of the population exposed to land degradation, there has been a decline from 18.7% to 9.3%. This share is the same for the female and male populations.

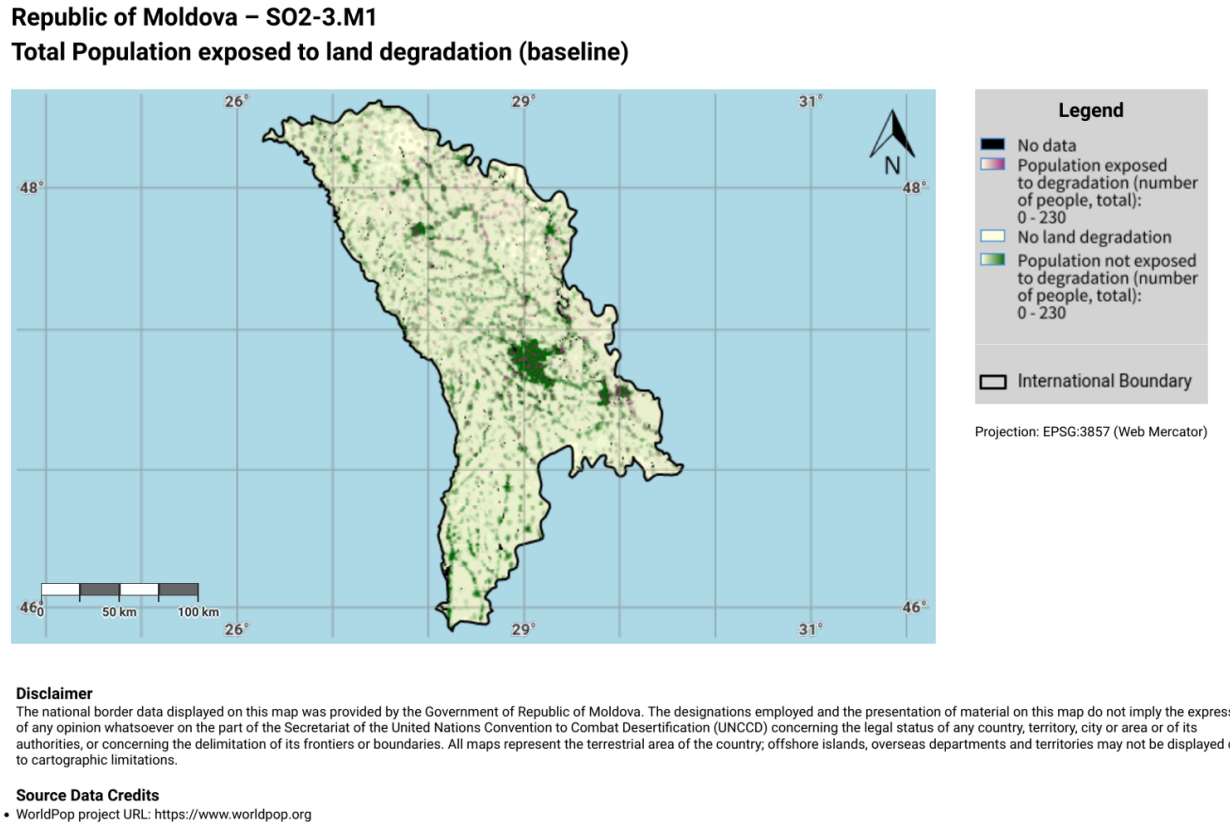


Figure 2.1. Population in the baseline period

2.4.2. Recommendations

The National Focal Point together with the interdepartmental working group responsible for the implementation of the UNCCD Convention will ensure the implementation of the following activities:

- monitoring of the data flow and modification of the methodology to allow the use of validated national data;
- continuous involvement of experts in the period between reports to prepare the necessary data, review the methodology, etc.;
- addressing desertification and focusing on the socio-economic factors driving desertification processes;
- stimulating social awareness and facilitating the contribution of the local population, especially women and youth, with the support of non-governmental organisations, to efforts to combat desertification and reduce the effects of drought.

2.4.3. Voluntary targets

- To progressively ensure access of the population of the Republic of Moldova to safe drinking water and adequate sanitation, thus contributing to the improvement of health, dignity and quality of life, as well as to the economic development of the country, by decentralising water supply and sanitation services, expanding water supply and sanitation systems and increasing the population's access to these services.
- Development of infrastructure of regional and local importance based on regional sectoral programs for water supply and sanitation services.
- Development of principles of regionalisation of public services in the areas of water supply and sanitation.
- Development and implementation of the National Program 'Ensuring modern and safe sanitary facilities in every school and kindergarten'.

SPECIFIC OBJECTIVE 3

TO MITIGATE, ADAPT TO, AND MANAGE THE IMPACTS OF DROUGHT IN ORDER TO ENHANCE RESILIENCE OF VULNERABLE POPULATIONS AND ECOSYSTEMS

3.1. Methodologies used

Various guidelines, instructions and tools provided by UNCCD were used to calculate the three Objective 3 indicators. These are outlined below and the methodologies are detailed in the Guidance.[8]

This Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3 has been prepared to support Parties in reporting on progress in drought mitigation, adaptation and management to enhance the resilience of vulnerable populations and ecosystems. The Guidance facilitates the work of Parties and provide guidance on the calculation and interpretation of indicators, in particular for global reporting on drought hazards, drought-prone populations and vulnerability to damage. These are the three main components of drought hazard, and each is represented by an indicator defined in the monitoring framework.

The methodological note 'Trends in Population Exposure to Land Degradation'[9] provides guidance on estimating the proportion of populations exposed to land degradation, disaggregated by sex, a first step towards addressing the gender gap in land degradation data in the UNCCD reporting framework.

Conservation International's free open source tool for monitoring land change indicators, https://docs.trends.earth/en/latest/Trends.Earth, allows users to draw on the best available information from across a range of sources – from globally available data to customised local maps. A broad range of users are applying Trends.Earth for projects ranging from planning and monitoring restoration efforts, to tracking urbanization, to developing official national reports for submission to the United Nations Convention to Combat Desertification (UNCCD).

3.2. Trends in the proportion of land under drought over the total land area

3.2.1. Situation analysis

Drought is defined as a period of dry weather long enough to cause a serious hydrological imbalance (World Meteorological Organization (WMO), 1992). The UNCCD Convention defines *drought* as the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems.

Droughts affect both the quantity of available water resources and their quality. Precipitation equal to or less than 50% of the climatic norm of precipitation (in this case we can speak of a severe drought) falls throughout the country with a probability of 11-41%. Thus, for this indicator, over the last 3 decades (1990-2020), droughts were recorded in 1990, 1992, 1994, 1996, 1999, 2000, 2001, 2003, 2007, 2012, 2015, 2017 and 2020. Of the 35 episodes of seasonal drought officially recorded in Moldova since 1945, 15 episodes occurred after 2000, 10 of which were classified as catastrophic.

Between 2015 and 2020 alone (the period analysed in the Report), the country experienced 3 severe droughts (2015, 2017 and 2020) affecting about 5% of the country's territory. The south of the country was the most affected and the northern region the least affected. The drought in the summer of **2015** caused fluctuations in the value added of agricultural products, disrupting household consumption and limiting overall GDP growth.

In **2020**, Moldova experienced one of the worst droughts in the last two decades, causing a 30% drop in agricultural production and significant ripple effects throughout the country's economy, leading to a contraction of income and consumption and a full-scale recession, putting additional pressure on the budget. The damage to agriculture totalled about MDL 6 billion.

8 Good Practice Guidance for National Reporting on UNCCD Strategic Objective 3: *https://www.unccd. int/sites/default/files/documents/2021-09/UNCCD_GPG_Strategic-Objective-3_2021.pdf*

9 https://www.unccd.int/sites/default/files/2022-02/MethodologicalNote_PopExposureToLD.pdf

The likelihood of multi-year droughts will increase, and if not handled properly, the consequences for the economy will be devastating. The average frequency of droughts is 1-2 episodes per decade in the northern region, 2-3 in the central region and 5-6 in the southern region.[10]

It is estimated that Moldova will face widespread and extreme widespread droughts every two to three years. Seasonal droughts will occur almost every year, affecting crop development and yields. The main approach in drought situations is focused on risk management rather than crisis management.

The main causes of soil degradation and its impacts are:

- non-compliance with crop rotation, which leads to changes in soil structure, disturbance of soil nutrient balance, soil erosion and reduction of crop yields;
- reduction of fodder and legume crops, which leads to a decrease in the amount of nutrients needed for growing crops;
- reduction in the use of organic and mineral fertilisers, leading to loss of soil organic matter, soil compaction, deterioration of its physical structure and reduction of fertility;
- changes in hydrological conditions resulting in reduced water infiltration and loss of surface soil;
- deforestation of forests and field buffer strips causing severe droughts, wind and water erosion, soil desertification and loss of biodiversity;
- poor pasture management leading to degradation of soil structure and cover;
- improper use of heavy machinery in agriculture, which leads to compaction of the soil surface and degradation of its structure;
- biological degradation of soil, leading to a decrease in its fertility and loss of productive potential.[11]

Degradation of high-quality crop soils causes enormous damage to the economy. The most affected groups are owners of agricultural land and agricultural producers.

The Republic of Moldova is a party to the UN Convention to Combat Desertification (Land Degradation Neutrality (LDN)) and is committed to taking concrete actions in this direction.

Therefore, the overall objective was to assess drought hazard and identify areas exposed to extreme drought in order to prioritise drought mitigation and adaptation efforts.

The UNCCD methodology to estimate indicator SO 3-1 recommends using a globally accepted drought index, the Standardised Precipitation Index (SPI), to characterize the meteorological drought hazard. Thus, the drought intensity class was calculated from the Standardised Precipitation Index (SPI) using the Trends.Earth tool.

There are several drought indices that might be used to estimate national drought hazard. The UNCCD methodology to estimate indicator SO 3-1 recommends using a globally accepted drought index, the Standardised Precipitation Index (SPI), to characterize the meteorological drought hazard.

However, Parties may report using other indices if already in use at national level. The SPI index is easy to estimate, especially for countries with small monitoring networks.

The use of SPI by all countries provides a set of indicators calculated according to a predetermined methodology, which facilitates the comparison of regional data (from different UNCCD countries). This reference is of great importance, but it also has hidden nuances, such as detailed assessment of the phenomenon of drought, especially its dangers.

10 National Development Strategy 'Moldova 2030' approved by GD No 1083/2018
11 Land Reclamation Program for Sustainable Soil Resources Management for 2021-2025 and its Implementation Action Plan for 2021-2023

Table 3.1. SPI and intensity class according to UNCCD Guidelines

SPI value	Drought intensity class
0 to -0.99	Mild drought
-1 to -1.49	Moderate drought
-1.5 to -1.99	Severe drought
-2 and below	Extreme drought

During the period under review, three droughts were recorded in the Republic of Moldova (2015, 2017 and 2020), which can be classified by intensity class according to the UNCCD Guidelines as follows: **2015 – severe drought; 2017 – mild drought; 2019 – moderate drought.**

In the following, we will only talk about drought hazard assessment using the SPI index. Note that global datasets (Global Precipitation Climatology Centre (GPCC) monthly products, 1982 to present) were used for the hazard assessment in this report. URL: https://opendata.dwd.de/climate_environment/GPCC/html/gpcc_monitoring_v6_doi_download.html) and (UNCCD Default Data, Treands.Earth Land Porductivity Dinamics). The results are presented as sets of maps in Figure 3.1.

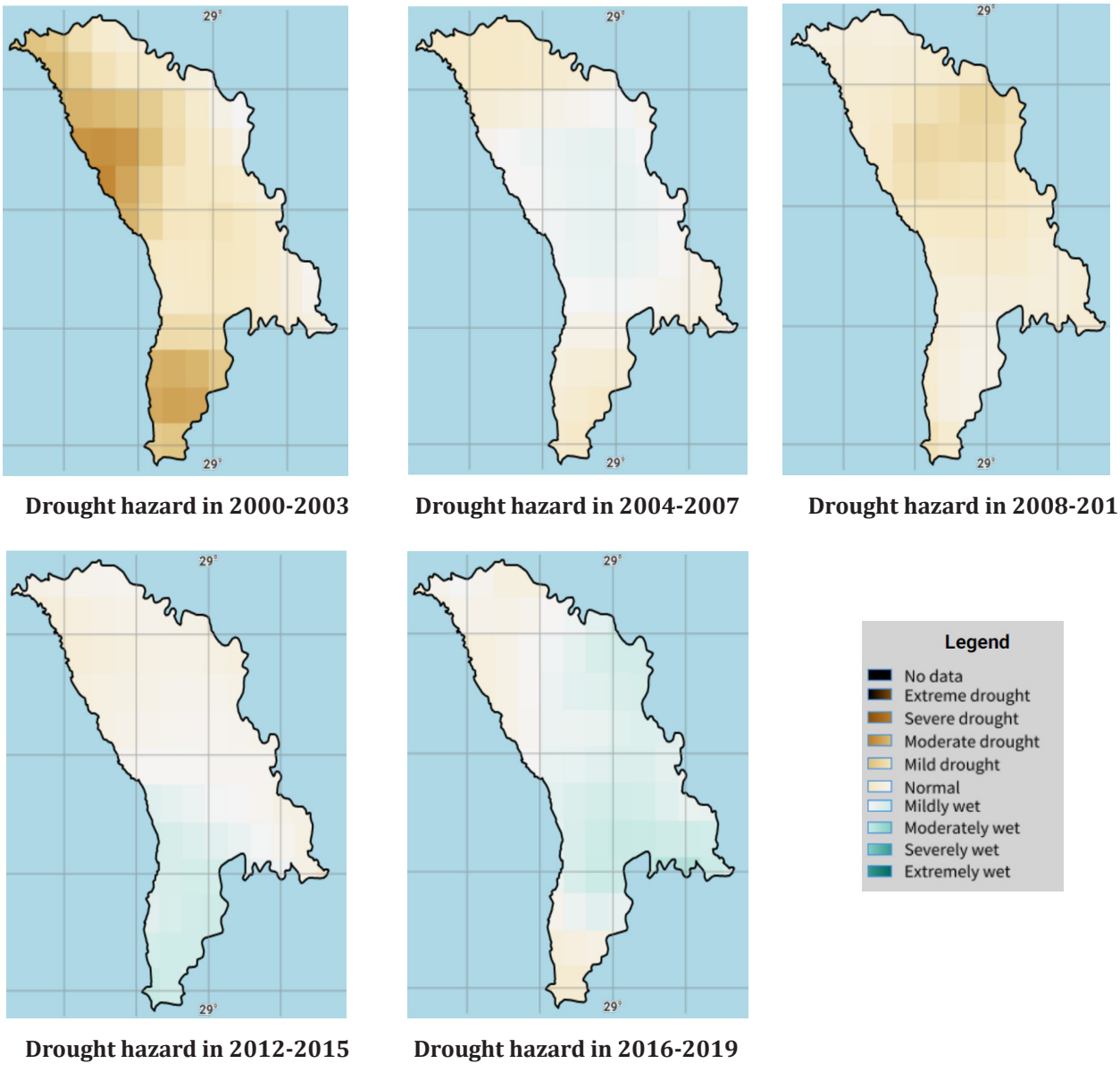


Figure 3.1. Dynamics of changes in drought hazard for different baseline periods

The assessment of the areas exposed to drought during the 2015-2019 baseline period according to the results obtained is presented in Tables 3.2 and 3.3.

Table 3.2. National estimates of land area attributable to each drought intensity class

Years	Mild drought (km^2)	Moderate drought (km^2)	Severe drought (km^2)	Extreme drought (km^2)	No drought (km^2)
2015	11295	7928	2951	7080	3954
2016					33209
2017	8053				25156
2018	5221				27988
2019	18819	1803	48		12539

Table 3.3. Summary table of land areas affected by drought, without breakdown by classes

Years	Total area affected by drought (km^2)	Proportion of land affected by drought (%)
2015	29255	89.0
2016		
2017	8053	24.5
2018	5221	15.9
2019	20670	62.8

From the information presented in the above tables, it is clear that according to the drought assessment methodology in the UNCCD guidelines, the most severe drought was recorded in 2015 when it affected 89.0% of the country's territory, of which 7,080 km^2 or 21.3% (an area comparable to the Raut River basin) was subjected to severe drought. The other dry years (according to the SPI index) are characterised by much smaller drought-affected areas of varying intensity. Although 2019 is notable for the fact that 62.8% of the country was affected by drought, these were mild to moderate droughts.

Severe droughts were observed in the years preceding the reporting period – 2000-2011 (Figure SO3-1a), while in the reporting period the SPI index indicates a slight moistening of the country's territory in the south.

3.2.2. Conclusions

The standardised SPI index (at least for the conditions of the RM) is not the most appropriate tool for drought hazard assessment. The territory of the country is currently (reporting period) less exposed to drought risk than in previous years. For example, in 2000-2003, the territory of the country was most exposed to drought hazard (Figure SO3-1a).

During the reporting period, the situation in RM was favourable from the point of view of drought hazard: comparable conditions were observed almost over the whole territory of the country, and in the south-western part of the country there was even an increase in humidity. (Figure SO3-1a).

3.2.3. Recommendations

Apply multi-criteria analysis (based on several drought hazard indicators, not just SPI) to get the real picture in drought hazard assessment.

It should be noted that the absence of a drought (hazard, vulnerability and risk) assessment methodology approved by the Moldovan legal framework required initiatives for drought hazard assessment and amendments to the legislative framework, which was reflected in the launching of specialised projects in this area (https://sc.undp.md/jobdetails/2742/).

The Government sees the National Adaptation Planning (NAP) process as key to achieving the adaptation goals outlined in the 2014 Climate Change Adaptation Strategy for Moldova and the Nationally Determined Contributions (NDCs) for 2020, as well as to the ongoing integration of climate change into its policy and budgetary processes.

The proposed project supports the Government of Moldova in advancing the second cycle of its National Adaptation Planning process (known as NAP-2).

The main objective of this mission is to support the national authorities of the Republic of Moldova in developing a methodology for assessing national drought hazards and risks using available data and adjusting the current legal framework accordingly.

This will enable the national authorities to effectively monitor drought trends, promptly respond to them and recommend solutions/measures for key sectors of the economy to mitigate the impact of drought.

3.3. Trends in the proportion of the population exposed to drought

3.3.1. Situation analysis and trends in the proportion of the population exposed to drought

Indicator SO 3-2 defines the exposure of the population to drought hazard (identified by indicator SO 3-1) as the total count of people exposed as well as the percentage of the total population exposed.

This indicator may be further disaggregated by sex.

The Trend.Earth tool was used to calculate population exposure to drought hazards by intensity class using five main steps:

1. Overlay population data on the spatial output according to SO 1;
2. Calculate the total population by country;
3. Calculate the population in each drought intensity class;
4. Convert the result obtained in step 3 to per cent.

The obtained results are presented in Figure 3.2.

The estimated population exposed to drought during the 2015-2019 baseline period, according to the results obtained, is presented in Tables 3.4 and 3.5.

Table 3.4. National estimates of the proportion of the population in each drought intensity class, as well as the total population and the proportion of the country's population exposed to drought regardless of drought intensity (Total population)

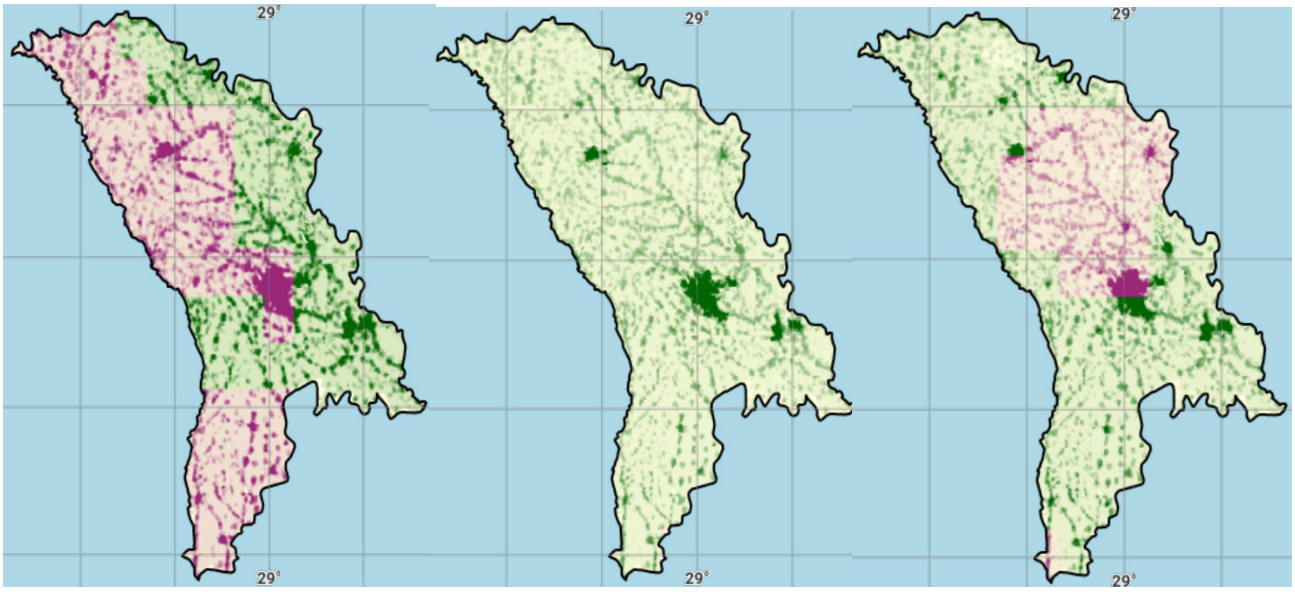
Years	Not exposed, total		Mild drought		Moderate drought		Severe drought		Extreme drought		Population exposed	
	number	%	number	%	number	%	number	%	number	%	number	%
2015	320108	8.5	1374594	36.4	1175511	31.2	250665	6.6	650451	17.2	3451221	91.5
2016	3762952	100										
2017	3016318	80.7	720014	19.3							720014	19.3
2018	3303378	88.6	424198	11.4							424198	11.4
2019	1151128	31	2137224	57.6	417061	11.2	5672	0.2			2559957	69

From the presented tables it follows that the initial data on the population of the Republic of Moldova are highly questionable.

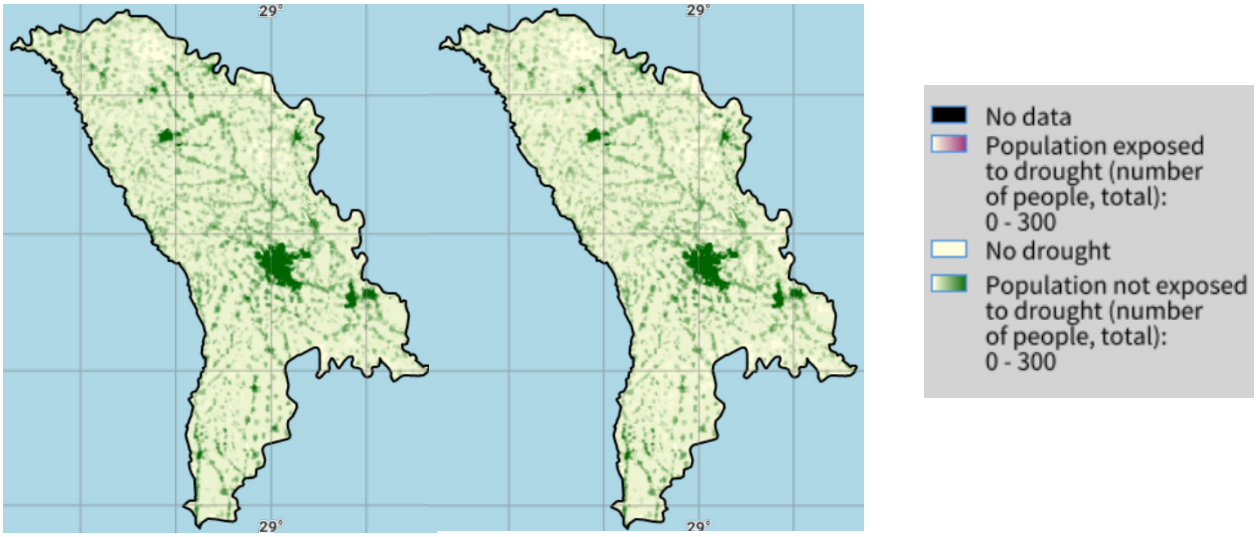
For example, in 2016 (a drought-free year), Moldova had 3,762,952 people (Table SO3-2T1), compared to 2,998,235 in the 2014 census. The difference is almost 1 million inhabitants, and it is very unlikely that in two years the population would grow that fast (https://recensamint.statistica.md/ro).

The figures in the report show that the worst drought of 2015 affected 91.5% of the population, severe drought affected 6.6% and extreme drought affected 17.2%.

The 2019 drought affected 69% of the population, with the majority affected by mild drought at 57.6% and moderate drought at 11.2%.



Population exposure to drought in 2000-2003 | Population exposure to drought in 2004-2007 | Population exposure to drought in 2008-2011



Population exposure to drought in 2012-2015 | Population exposure to drought during the reporting period

Figure 3.2. Dynamics of population exposure to drought for different base periods

Table 3.5. National estimates of the proportion of the population in each drought intensity class, as well as the total population and the proportion of the country's population exposed to drought regardless of drought intensity (Women)

Years	Not exposed, total		Mild drought		Moderate drought		Severe drought		Extreme drought		Population exposed	
	number	%	number	%	number	%	number	%	number	%	number	%
2015	169899	8.7	715948	36.6	606716	31	129636	6.6	335186	17.1	1787486	91.3
2016	1956833	100										0
2017	1571340	80.9	371724	19.1							371724	
2018	1723938	88.5	224011	11.5							224011	
2019	599578	30.9	1124076	57.8	216434	11.1	3021	0.2			1343531	

Table 3.6. National estimates of the proportion of the population in each drought intensity class, as well as the total population and the proportion of the country's population exposed to drought regardless of drought intensity (Men)

Years	Not exposed, total		Mild drought		Moderate drought		Severe drought		Extreme drought		Population exposed	
	number	%	number	%	number	%	number	%	number	%	number	%
2015	150209	8.3	658646	36.3	568795	31.4	121029	6.7	315265	17.4	1663735	91.7
2016	1806119	100										0
2017	1444978	80.6	348290	19.4							348290	19.4
2018	1579440	88.8	200187	11.2							200187	11.2
2019	551550	31.2	1013148	57.3	200627	11.3	2651	0.1			1216426	68.8

It should be noted that there is no clear exposure of women to drought in the gender structure, so the numbers of people exposed to drought are comparable by gender.

The UNCCD approach to drought vulnerability assessment is based on the Drought Vulnerability Index (DVI), which comprises three components that reflect the vulnerability of an individual country's population to drought, namely: a) social, b) economic and c) infrastructure.

Currently, the DVI does not take into account environmental or ecosystem vulnerability.

A drought vulnerability assessment is essential for identifying the underlying causes of drought, its impacts and, accordingly, developing appropriate responses (ICCD/COP(14)/CST/7).

National reporting has been facilitated through default data provided by UNCCD, Trends.Earth on Land Productivity Dynamics.

3.3.2. Conclusions

It is obvious that the larger the drought hazard area and the more densely populated it is, the greater the exposure of the population to drought. So basically everything depends on the method of hazard assessment (in our case, SPI).

According to the data obtained, the situation of the population's exposure to drought is more favourable than in the previously analysed periods (Figures SO3-2a and SO3-2b). The number of people exposed to drought varies from year to year but the trend is clearly downwards.

3.3.3. Recommendations

Apply multi-criteria analysis (based on several drought hazard indicators, not just SPI) to get the real picture in drought hazard assessment.

It should be noted that this problem is also identified in the NAP-2 project (as mentioned above), and the gaps related to drought assessment and the necessary changes in the Moldovan legal framework will be addressed.

3.4. Summary conclusions and recommendations SO3. Voluntary targets.

3.4.1. Conclusions

The WMO-approved Standardised Precipitation Index (SPI) for meteorological drought monitoring (Hayes et al., 2011) was used to calculate trends in the share of drought-affected land in the total land area.

In RM, the SPI is calculated at agro-meteorological stations, and their spatial distribution does not allow an accurate assessment of indicators for all districts. National data collection standards are not in line with UNCCD standards.

In RM, droughts account for 12.5% of the total number of hazardous events (http://www.meteo.md/). Drought causes great losses in agricultural production. In the past, its consequences were particularly severe, especially when there have been two or three consecutive years of drought. According to the drought intensity class and the analysed data for the reporting period 2000-2019, the most severe droughts that occurred in Moldova can be considered the droughts of 2000, 2003, 2007, 2009, 2011, 2015 and 2019. In 2000, 2007, 2009 and 2011, the entire country was affected by drought. In 2003, it affected 95.6% of the country's territory, and in 2015 it affected 89%.

Population dynamics in RM is presented based on census data (every 10 years), so national data do not allow for a correct assessment of the population exposed to drought. According to the default data obtained, a large proportion of the

population suffers from moderate drought almost every year. Moderate droughts occur about once every 5 years, severe droughts have occurred 5 times between 2000 and 2019, and extreme droughts have occurred 2 times (2011, 2015).

Population exposure to drought was disaggregated by sex. These datasets were obtained by gridding subnational age-sex information and overlaying it with the corresponding population datasets. The main source of information for these data sets are national population censuses, micro-censuses and household surveys. Thus, the results obtained and uploaded to the system suggest that women are affected in a higher percentage of cases than men.

By default, country-level data is used, which is appropriate for our country: a more detailed breakdown is not relevant for such a small territory.

We believe that the time until the next report should be used for drought assessment using national data and applying other indicators relevant for the Republic of Moldova.

The Drought Vulnerability Index (DVI) covers both the short-term adaptive capacity and the long-term adaptive capacity of the population, comprising three components: social, economic and infrastructure. Our country's Drought Vulnerability Index (DVI), according to the European Commission's Joint Research Centre, is only available for 2018.

3.4.2. Recommendations

In order to ensure the quality and efficiency of the implementation of the UNCCD Convention and initiatives on LDN and drought, and to facilitate the reporting process on these initiatives, it is recommended that the following activities be organised and carried out:

- Develop, test and implement drought assessment methodologies using appropriate indicators for the Republic of Moldova.
- Collect and store data according to a single principle, which ensures standardisation and homogeneity of databases, as well as their usability.
- Develop and implement an operational liaison procedure between relevant institutions, agreed upon by all parties involved in the implementation and reporting of UNCCD and LDN and drought initiatives, to facilitate the exchange of information and data.
- Establish a national monitoring system adapted to the international one. Launch a campaign to standardise national indicators in cooperation with relevant bodies and institutions at home and abroad.
- Adapt national systems and methodologies for classifying indicators to international ones.
- Continuously involve the institutions responsible for data collection and analysis in the UNCCD implementation process to be ready for national reporting, which is done every 4 years.
- Adjust the national legal and regulatory framework in this area.
- Organisation of meetings by the UNCCD secretariat to train national experts on the reporting process for each target.
- Raise public awareness on desertification and drought (seminars, contests, etc.).
- National observance of the World Day to Combat Desertification – 17 June.

3.4.3. Voluntary targets

The following voluntary targets have been proposed for this objective (in addition to 1.5.3):

- Ecological reconstruction of protective forest belts for agricultural land up to 100%.
- Increase the area of state-protected natural areas to 8% of the country's territory.
- Increase the area covered with forest vegetation outside the forest fund by 55.0 thousand ha, including through further promotion of agroforestry and forest-pasture practices: e.g. by improving pasture quality.
- Increase the area of afforestation at the expense of degraded lands unsuitable for agriculture by 81.0 thousand ha at the expense of state and privately owned lands.
- Increase the productivity of about 800 ha of community grassland.
- Reconstruction and/or restoration of about 1.2 thousand ha of forests and other forest vegetation owned by the mayoralties.
- Develop forest management plans for about 3.2 thousand ha of forests and other forest vegetation owned by the mayoralties.

SPECIFIC OBJECTIVE 4

TO GENERATE GLOBAL ENVIRONMENTAL BENEFITS THROUGH EFFECTIVE IMPLEMENTATION OF THE UNCCD

4.1. Trends in abundance and distribution of selected species

4.1.1. Methodologies used

A detailed description of the Red List assessment process is available at https://www. iucnredlist.org/assessment/process, which is the starting point for analysing the Red List Index (RLI). Data on SDG indicators are available at: https://unstats.un.org/sdgs/.

In order to facilitate the implementation of the global framework of indicators, they have been categorised by the IAEG-SDG into three levels according to their level of methodological sophistication and the availability of global data. Among the indicators mentioned is the Red Book Index, which is categorised as level 1: The indicator is conceptually clear, has an established international methodology, and data is regularly produced by at least 50% of countries and every region where the indicator is relevant.

Current data are available for all countries of the world and are updated annually. Index values for each country are available in the UN SDG Indicators database at https://unstats.un.org/sdgs/indicators/database/. Red List index graphs and core index data are available for each country at https://bipdashboard.natureserve.org /bip/SelectCountry.html, and the Integrated Biodiversity Assessment Tool for countries can be found at https://ibat-alliance.org /country_profiles. The RLI value ranges from 1 (all species are categorised as Least Concern) to 0 if all species are categorised as Vulnerable (VU), Endangered (EN) or Critically Endangered (CR) rarity categories. The national RLI is also calculated depending on the availability of data at the country level.

4.1.2. Situation analysis

Moldova's most valuable wealth is its natural resources: forests, soil, water, flora and fauna. Currently, the country is undergoing profound socio-economic changes affecting the functional sustainability of natural ecosystems and causing a decline in biodiversity. Global climate change is also having a negative impact on flora and fauna. Flora and fauna resources are of great economic importance as a source of food, medicines, raw materials for industrial technology and other material goods.

In 1963, the IUCN (International Union for Conservation of Nature) developed and published the Red Data Book, which became an international standard-setting instrument representing a primary list of animal and plant species worldwide in urgent need of conservation. The IUCN Red List Categories and Criteria – Version 3.1 were first published in 2001, following their formal adoption by the IUCN Council in February 2000. They are intended to be an easily and widely understood system for classifying species at high risk of global extinction. There are 9 of them:

1. EXTINCT (EX). A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual and there is no reasonable doubt that the last individual has died.
2. EXTINCT IN THE WILD (EW). A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range.
3. CRITICALLY ENDANGERED (CR). A taxon is Critically Endangered when the best available evidence indicates that the species' populations have declined by more than 80% and it is therefore considered to be facing a very high risk of extinction in the wild.
4. ENDANGERED (EN). A taxon is Endangered when the best available evidence indicates that the species' populations have declined by more than 50-70%, its range is highly fragmented, and it is therefore considered to be facing a very high risk of extinction in the wild.
5. VULNERABLE (VU). A taxon is Vulnerable when the best available evidence indicates that the species' populations have declined by more than 30%, are on a declining trend, and it is therefore considered to be facing a very high risk of extinction in the wild.

6. NEAR THREATENED (NT). A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
7. LEAST CONCERN (LC). A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
8. DATA DEFICIENT (DD). A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat.
9. NOT EVALUATED (NE). A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

The Red List Index (RLI) is based on the IUCN Red List of Threatened Species and is an indicator of the changing state of global biodiversity. It defines the conservation status of major species groups, and measures trends in extinction risk over time. The Red List Index can be used to assess the overall change in the extinction risk of groups of species due to threats such as habitat destruction and degradation, overexploitation, alien and/or invasive species, anthropogenic disturbance, pollution and climate change, and the extent to which these threats have been mitigated.

After analysing the sources indicated in the methodologies, a table on the Red List Index, minimum and maximum limits for 2000-2020 was compiled using default data from the SDG database (Sustainable Development Goal 15 – Life on Land, Indicator 15.5.1. – Red List Index).

Table 4.1. Red List Index, minimum and maximum limits

Year	Red list index	Lower limit	Upper limit
2000	0.94138	0.92841	0.94232
2001	0.94137	0.92889	0.94231
2002	0.9414	0.92867	0.94231
2003	0.94141	0.92842	0.94232
2004	0.94162	0.92843	0.94232
2005	0.94164	0.92906	0.94234
2006	0.94187	0.92916	0.94258
2007	0.94211	0.92889	0.94294
2008	0.94235	0.92863	0.94356
2009	0.94259	0.92885	0.94384
2010	0.94294	0.92559	0.94517
2011	0.9432	0.92669	0.94638
2012	0.94341	0.92555	0.94773
2013	0.94365	0.92369	0.94853
2014	0.94396	0.92294	0.94959
2015	0.94416	0.92207	0.95076
2016	0.94439	0.92187	0.9517
2017	0.94462	0.92214	0.95399
2018	0.9449	0.92023	0.95453
2019	0.94504	0.92028	0.95658
2020	0.9453	0.91763	0.95745

It was also found that for Moldova the RLI ranges from 0.941 to 0.945, and the status of flora and fauna species has not changed much over the last 20 years, most of them being categorised as Least Concern.

In addition, due to Moldova's accession to international environmental conventions, participation in international biodiversity conservation projects, and a large number of publications in international scientific journals, the visibility of data has increased significantly over the last 10 years, which also contributed to an increase in the index value, albeit insignificant.

Over the period 2000-2020, RLI changed very little at only 0.02% per year. However, at the national level, data on the rarity categories of flora and fauna species are presented differently due to their protection at the national level, without the need for protection at the global level.

For the RM, the conditions for applying the criteria stem from the following considerations:

- high-level transformation of natural ecosystems and their exceptional fragmentation, which subsequently conditions the genetic degradation of native species that started 100 years ago and the spread of many opportunistic and invasive species;
- lack of information on the presence of certain taxa and their distribution in the country over the last 20-50 years, lack of information on the population size of the species;
- rapid changes in populations of higher plants, especially herbaceous steppe and grassland plants, and a sharp decrease in the number of animal species or even extinction of some species;
- abiotic and biotic specificity of the RM as a European territory, which is characterised by:
  - *diverse structure of the distribution of abiotic conditions in space (differences between northern, central, southern areas);*
  - *the country's location at the junction of three biogeographical zones, which contributed to the diversification of flora and fauna;*
  - *the presence of endemic and more widespread Moldavian-Podolian species, as well as the possible existence of stenobiont species;*
  - *concentration of species richness of specific taxa.*

In the period 2000-2020, comprehensive assessments of the status of plant and animal species were carried out and 2 editions of the Red Data Book of RM were published (2001, 2015), in which 3 rarity criteria were used for individual species: Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). Extinct species of the country's flora and fauna are not listed. Comparing the flora and fauna of the two editions, a significant difference between the number and status of species can be clearly seen (Table 4.2).

Table 4.2. Plant and animal taxa from two editions of the Red Data Book of the Republic of Moldova

No.	Taxon	2001	2015
Plants			
1	Magnoliopsida	50 species	99 species
2	Liliopsida	31 species	52 species
3	Pinophyta	1 species	1 species
4	Pteropsida / Pteridophyta	9 species	14 species
5	Bryophyte	10 species	7 species
6	Algae	-	8 species
7	Lichenophyte	16 species	28 species
8	Mycophytes / Fungi	9 species	
Total		**126**	**209**
Animals			
1	Mammals	14 species	30 species
2	Birds	39 species	62 species
3	Reptiles	8 species	9 species
4	Amphibians	1 species	9 species
5	Fish	12 species	23 species
6	Cyclostomata	1 species	1 species
7	Insects	37 species	80 species
8	Crustaceans	1 species	1 species
9	Shellfish	3 species	3 species
10	Collembola	-	1 species
Total		**116**	**219**

Between 2000 and 2015, the share of rare plant species increased by about 40% and of protected animal species by 47%.

Among plants, a dramatic increase in protected species, by about a factor of 2, was observed in the class Magnoliopsida, which includes the largest number of families, and in the class Liliopsida by about 40%.

Among animals, a significant increase in protected species occurred in mammals – 53%, birds – 37%, amphibians – 9 times, fish – 48%, insects – about 54%.

Among mammals, bats (order Chiroptera) showed the greatest increase in rare species – from 6 to 16 species. Virtually all animal species in Europe are included in Annex II of the Habitats Directive as species of community interest whose protection requires the designation of Special Areas of Conservation, and in the Bern Convention on the Conservation of European Wildlife and Natural Habitats in Annex II (strictly protected fauna species).

Bat species are included in the UN Convention on the Conservation of Migratory Species of Wild Animals (CMS) and are protected under the Agreement on the Conservation of Populations of European Bats (Eurobats). The CMS and Eurobats have declared 2011-2012 as the International Year of the Bat. Many European countries celebrate the European Bat Night, an event dedicated to raising awareness and informing the general public about the importance and uniqueness of bats and the need to protect them.

Ramsar sites and Important Bird Areas are of particular importance for avifauna. Numerous migration routes pass through the territory of the RM, the most important of which is the Via Pontica migration route. As a result of long-term monitoring, a map of bird migrations across the country was compiled (Figure 4.1).

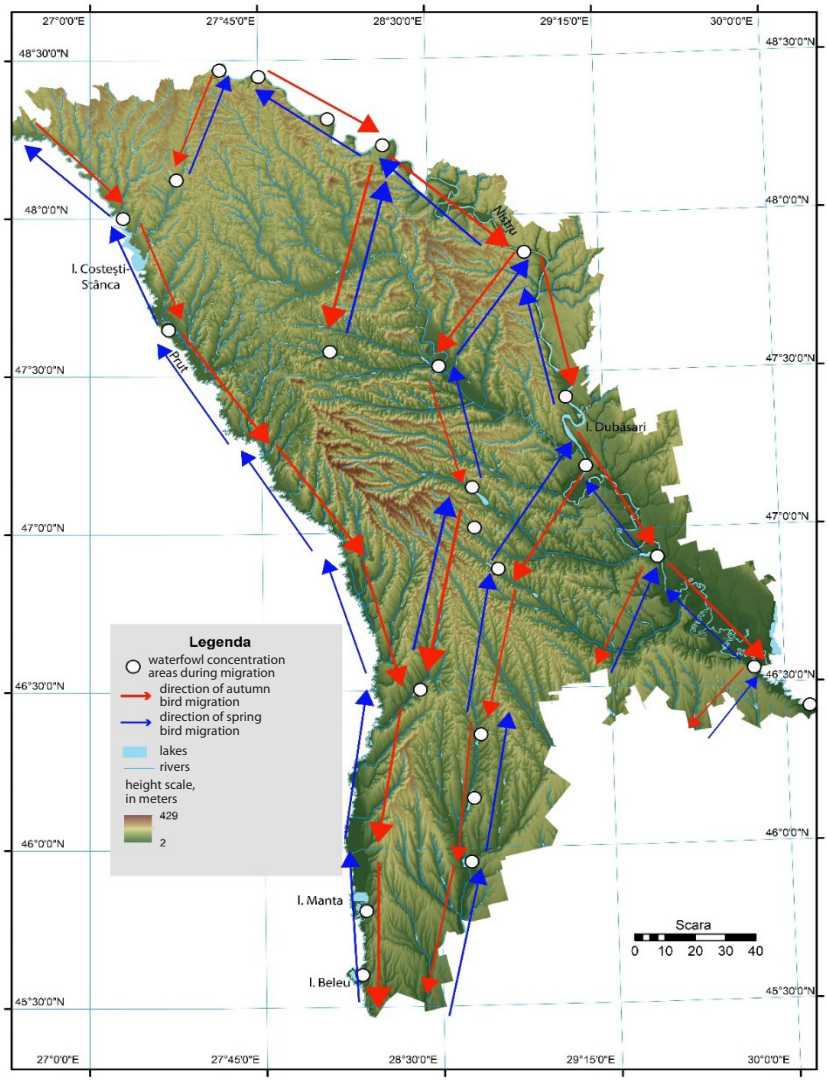


Figure 4.1. Map of the main directions of bird migration in the Republic of Moldova

Extensive studies on the territory of the RM during all phenological periods have shown that the main migration corridors of birds follow the main waterways – the Prut and Nistru rivers, as well as several routes in a west-east direction in the southern part of the country and in a south-west to north-east direction in the central part of the country. During migration, waterfowl and shorebirds stop at large bodies of water where several thousand birds congregate. The spring migration takes place from the third decade of February to early April. The autumn migration starts in late August and lasts until mid-November with fluctuations of 1-2 weeks depending on weather conditions. During these periods, the population of breeding birds (about 180 species) is supplemented by migratory species (over 150), many of which are protected at European level.

Human activities of draining wetlands for agriculture, draining marsh habitats and building dams, which began in the last century, have gradually reduced the range and abundance of amphibian species.

Amphibian species have deteriorated further in recent decades due to climate change and prolonged droughts. The lack of rainfall has dried up many of the small temporary lakes that served as breeding grounds. This has led to a decline in reproductive success and a downward trend in population size. As a result, many species have become vulnerable and now make up about 65% of all amphibian species in the country.

The 80 insect species listed in the Red Book of RM (2015) include butterflies, beetles, wild bees, bumblebees, mantises, ants, dragonflies, etc., which are now endangered or drastically declining due to the widespread use of insecticides. All the negative effects caused by insects are the consequence of ecological imbalance, massive deforestation, destruction of natural habitats, climate change phenomena, which are in fact the result of anthropogenic activities.

The expansion of agricultural land, intensive use of natural resources has led to a significant decline in the numbers of many insect species, which have become rare, and their presence in an area is an indicator of ecosystem health. Insect monitoring is particularly important in the current arid conditions. As valuable bioindicators, insects are also an important link in trophic chains, serving as food for mammals and insectivorous birds, reptiles, other insects; they play an important role as pollinators of wild and cultivated plants. The decline in insect abundance is an alarming signal of the current state of habitats and environments, which have been anthropogenically altered.

An important element of rare species are endemics, most of which have been recorded among plants: *Sezseli peucedanifolium* – Pontic endemic, *Schivereckia podolica* – Ponto-Podolian endemic, *Eremogone cephalotes* – Pontic endemic, *Galanthus plicatus* – Pontic endemic, *Genista tetragina* – Pontic endemic, *Plantago schwarzenbergiana* – Pannonic endemic, *Allium podolicum* – Pontic endemic, *Ornithogalum amphibolum* – Pontic endemic, *Ornithogalum oreoides* – Pontic endemic, *Gagea ucrainica* – Pontic endemic, *Koeleria moldavica* – Podolian endemic, *Poa versicolor* – Podolian endemic, *Sesleria heufleriana* – Carpathian endemic, *Jurinea stoechadifolia* – Pontic endemic, *Colchicum arenarium* – Dobrogean-Pontic endemic, *Aconitum eulophum* – endemic to RM.

Animals include the endemic Colembola species *Lathiopyga nistru* Buşmachiu, Deharveng, Weiner, 2010, *Neanura moldavica* Buşmachiu, Deharveng, 2008, *Micraphorura gamae* Buşmachiu, Weiner, 2013, *Agraphorura otaci* Weiner, Buşmachiu, 2022, *Arrhopalites prutensis* Vargovitch, Buşmachiu, 2015, as well as 8 species of the genus Pseudosinella, recorded so far only in RM, *Orchesella pontica* Ionesco, 1915 – Pontic endemic.

Endemic insects include *Chorebus ioni* (Lozan, Tobias, 2002) of the Hymenoptera.

Rare species are in many cases also indicators of the state and quality of the environment. Bioindicators are species, populations or assemblages of species that, through their variability (biochemical, physiological, ethological or ecological), make it possible to characterise the state of an ecosystem and detect natural or anthropogenic changes in it as early as possible (Blandin, 1986).

Determination of the ecological health of indicator species can be done by observing and recording factors of growth or decline in population size and density.

A change in these factors may indicate a change in environmental conditions. Such changes may include pollution levels, disease outbreaks, climate change, habitat fragmentation, soil contamination or species competition.

Plants, algae and fungi are often used by researchers as indicator species because, in most cases, they are only found in certain ecosystems and are sensitive to environmental changes. Certain types of mosses can indicate high levels of acidity in the soil. Rare fungi and beetles are indicators of old-growth forest health. In addition, dense populations of fungi in the forest indicate the presence of habitats that have not been anthropogenically impacted.

Rare species of insects are stenotopic, inhabiting only certain environments and even certain plants. Therefore, they can serve as indicators of the quality of steppe ecosystems, natural forests of European importance, natural grasslands, etc. Studies conducted in the country have shown that species of Neatus picipes, Tenebrio opacus, Uloma culinaris and Diaclina testudinea of the family Tenebrionidae (Coleoptera) can be used as bioindicators of well-preserved and valuable forest ecosystems.

Among terrestrial vertebrates, amphibians are used as indicator species because they absorb pollutants through their permeable skin that may come from terrestrial or aquatic environments. A wide variety of rare small, medium and large mammal species are used as indicators of ecosystem quality.

Climate change has led to the emergence of a number of invasive pest species. They have been entering the territory of the Republic of Moldova for many years and showed the same behaviour as in their native territory: they developed on host plants, adapted to certain climatic fluctuations, their populations became stable over time and acquired some resistance to certain external factors. As a result, they expanded their range, often exceeding the threshold of harmfulness.

All invasive wildlife species have a negative impact on native flora and fauna, including rare species of economic interest (Cameraria ohridella, Ericoccus buxi, Halyomorpha halys, etc.), replace species of lower ecological value in food chains (Canis aureus), compete with native species, causing a decrease in their populations (Mustela vison vs M. lutreola, Streptopelia decaocto vs. lutreola, Streptopelia decaocto vs. S. turtur), disturb the genetic status of local species through interspecific hybridisation (Cervus nippon vs. C. elaphus), and are carriers of pathogens harmful to plant, animal and human health, as well as to ecosystem health.

4.1.3. Conclusions

It can be noted that the changes in the Red List Index have a positive trend in the RM in recent times. Among the reasons for these positive changes are:

- institutional and legislative development in the field of biodiversity. To achieve biodiversity conservation goals, the Republic of Moldova is a party to 18 international environmental conventions, 10 of which directly promote the conservation of biodiversity and natural heritage;
- increased public awareness of rare species and the need to protect them. More intensive popularisation of research results and scientific innovations through journals, broadcasts, interviews, websites, etc. Currently, there are more than 50 officially registered NGOs in the field of environmental protection and biodiversity in Moldova. (https://e-circular.org/wp-content/uploads/2020/Lista%20ONG-uri%20de%20mediu.pdf);
- higher share of protected areas, increase in afforestation and planting of protective forest belts. For forests to effectively fulfil their ecoprotective functions, the degree of afforestation in a country must exceed 15 per cent. The Biodiversity Strategy of the Republic of Moldova for 2015-2020 states that forest ecosystems cover 365 thousand ha (11.4% of the country's territory). It can be concluded that afforestation has increased by about 2% in recent years, which is still not enough to allow flora and fauna to thrive;
- integrated approach to biodiversity, increasing the efficiency of biodiversity management outside protected areas in order to preserve the ecological integrity of ecosystems in the Republic of Moldova, implementation of organic farming practices.
- The existence of 3 Ramsar sites on the territory of the country: Lower Prut Lakes Ramsar Site No 1029 – the first Ramsar site designated in Moldova on 20.06.2000; Lower Nistru Ramsar Site No 1316, recognised on 20.08.2003; Unguri-Holoşniţa Ramsar Site No 1500 recognised on 14.09.2005. All of them are of special importance for the conservation of wetland habitats and biodiversity, especially birds;
- establishment of the first National Park 'Orheiul Vechi' by GD No 923 of 12.11.2014 (http://lex.justice. md/index.php?action=view&view=doc&lang=1&id=355414). There is a special regime of protection and preservation of wild species of plants and animals, elements and formations of special ecological, scientific, recreational and cultural value present in the park. The main nuclei of the park are Orheiul Vechi Cultural and Natural Reserve, Trebujeni Landscape Reserve, Curchi forest area with the monastery of the same name, and Ţiganeşti Landscape Reserve with the Ţiganeşti Monastery. The objectives of establishing the national park are: ensuring biodiversity conservation, maintaining and improving the quality of ecosystem services, preserving the genetic diversity of plants, promoting the development of ecological agriculture, restoring forests, grasslands, lakes, preserving water resources, increasing recreational activity and realising tourism potential.
- establishment of the Lower Prut Biosphere Reserve under Law No 132 of 13.07.2018 on the Establishment of the Lower Prut Biosphere Reserve https://www.legis.md/cautare/getResults?docid=105493&lang. The total area of the reserve is 14771.04 ha, including 824 ha of forest land on the territory of Slobozia Forestry – Silva Sud Forestry Unit, Manta-V Forestry Unit and Lower Prut Nature Reserve. The reserve comprises a complex of habitats including forests (356 ha), reedbeds (306 ha), ponds (244 ha) and grasslands (124 ha), with an increased diversity of plant communities;
- establishment of a second Lower Nistru National Park. At its meeting on 9 March 2022, the Government approved the law on the establishment of the Lower Nistru National Park with an area of 62,000 hectares. The park will be divided into functional zones with a distinct legal regime in accordance with Article 34(1) of Law No 1538/1998 on the Fund of State Protected Natural Areas, which provides for functional zones, ranging from completely protected areas to economic zones, in which only economic activities that do not contradict the national park regime can be carried out.

4.1.4. Recommendations

1. Carry out continuous monitoring of the impact of climate change on the status and adaptation characteristics of plant and animal species. Implement monitoring of the invasion and impacts of non-native species, including invasive species that emerge annually due to climate change.
2. Conduct a comprehensive inventory and assessment of the status of flora and fauna species, resulting in a new edition of the Red Data Book of the Republic of Moldova and a number of publications at national and international levels. This will further increase the visibility and availability of information from the RM at European level.
3. Develop organic farming, reduce the use of pesticides, which destroy in large quantities not only harmful insects, but also many useful species. Insectivorous animals are directly and indirectly affected by pesticides. On the one hand, they consume large numbers of insects and accumulate toxins in their bodies that can kill them, and on the other hand, they drastically reduce the size of their food base. Introduce pest control species for pest management.
4. Create a network of green corridors (forest belts and plantations) that will connect natural and man-made ecosystems, facilitate animal migration and contribute to biodiversity enrichment outside the protected areas, including agrocenoses, which make up 80% of the territory.
5. Continue activities to raise environmental awareness of the general public, especially youth, on biodiversity conservation and ecosystem services provided by flora and fauna.

4.2. Trends in protected area coverage of important biodiversity areas

4.2.1. Methodologies used

Trends in the coverage of areas of special interest for biodiversity (average share of terrestrial Key Biodiversity Areas (KBAs) covered by protected areas) were analysed.

All areas of special interest for biodiversity (11) were examined and a review of the scientific literature was conducted to determine what other areas could be nominated for international recognition as areas of special interest for biodiversity in the near future.

At present, the use of national data on areas of special interest for biodiversity (Key Biodiversity Areas (KBAs)) is not possible due to the lack of information on them in the country. There is no official document confirming their designation. Therefore, data from BirdLife International were used, according to which there are 11 Important Bird Areas (IBAs) in Moldova.

4.2.2. Situation analysis

Given that Moldova has started the process of establishing the Emerald network at the national level – a useful tool for the conservation of areas of high ecological value, providing a basis for co-operation within a homogeneous network of areas covering the whole of Europe, equivalent to the Natura 2000 network in non-EU countries – it is necessary to reassess the trends in the coverage of areas of special interest for biodiversity.

The total area of the Emerald Network in Moldova is 277157 ha, or 8% of the country's territory (https://www.legis.md/cautare/getResults?doc_id=133945&lang=ro), which exceeds the area of state protected natural areas by about 2.4%.

61 Emerald sites selected and approved by Law 94/2007 on the Ecological Network will ensure the conservation and especially the reversal of the negative trend in the conservation status of 37 habitats and 163 plant and animal species, including 16 plant species, 147 animal species (birds – 85 species, mammals – 14 species, amphibians – 3 species, fish – 19 species, reptiles – 2 species, invertebrates – 23 species).

Table 4.3. Bird Areas (IBAs) belonging to the Republic of Moldova

Country/Territory	Site name	IBA Criteria	Final Code
Moldova	Beech Land Forest	B2, B3	MD004
Moldova	Central Forest	B2	MD005
Moldova	Congaz – Taraclia Lakes	A1, B2	MD008
Moldova	Costești – Stânca Lake	A4iii	MD002
Moldova	Dniester River between Naslavcea - Soroca	A4iii, B2	MD001
Moldova	Hâncești Forest	B3	MD010
Moldova	Lower Dniester River	B2	MD006
Moldova	Lower Prut River and Manta-Beleu Lake	A1, A4iii, B2	MD007
Moldova	Purcari - Etulia	A1, B2	MD009
Moldova	Royal Forest	B2	MD003
Moldova	Tigheci Forest	B3	MD011

Most of the selected bird areas are part of the scientific reserves included in Law 538/1998 on the Fund of State Protected Natural Areas.

Table 4.4. Proportion of biodiversity and freshwater sites covered by protected areas, by ecosystem type

Year	Coverage of protected areas (%)	Lower limit	Upper limit
2000	47.17582	24.74517	**72.60684**
2001	48.6035	26.34874	**73.36923**
2002	50.99345	27.68981	**74.08645**
2003	53.84913	28.71468	**75.09550**
2004	57.63095	32.79638	**78.62375**
2005	59.66473	34.46808	**83.25399**
2006	62.24961	38.65487	**85.64343**
2007	65.04783	39.65598	**85.64343**
2008	68.35161	45.24661	**85.64343**
2009	70.01069	52.61427	**85.98414**
2010	7176309	53.06293	**85.98414**
2011	73.80241	59.05762	**85.98414**
2012	77.08341	61.55713	**85.98414**
2013	78.14531	63.74679	**85.98414**
2014	79.36232	65.86267	**85.98414**
2015	83.94482	69.88669	**85.98414**
2016	85.98414	73.61308	**85.98414**
2017	85.98414	73.70301	**85.98414**
2018	85.98414	76.50663	**85.98414**
2019	85.98414	85.98414	**85.98414**
2020	**85.98414**	**85.98414**	**85.98414**

Since 2016, the proportion of sites important for terrestrial and freshwater biodiversity covered by protected areas by ecosystem type has not changed, as the area of protected areas has not increased.

4.2.3. Conclusions

The analysis of important biodiversity areas reflects the coverage of different ecosystems ranging from beech, oak woodland, grassland, wetlands to water bodies.

However, there is no database of key biodiversity areas (KBAs) at the national level, nor is there a GIS database for state protected natural areas.

It is difficult to demonstrate the actual coverage of areas of special interest for biodiversity by protected areas, as there is no boundary delineation of state protected areas.

The country has started the process of delineating the boundaries of the state forest fund, but not of the state protected areas, therefore a reassessment of both state protected natural areas and areas of special conservation interest is needed.

The anthropogenic impact on biodiversity in Moldova is enormous, given that we are an agrarian country where almost all land is used, and there are practically no areas completely untouched in terms of fauna and flora.

Thus, at the national level, there is a lack of reliable data on areas of special conservation interest, a lack of coordination between the different actors responsible for monitoring the conservation status of sites and the species that inhabit them, and a lack of a methodology for designating areas of special conservation interest at the national level.

4.2.4. Recommendations (on fauna)

In order to ensure the protection of biodiversity sites included in protected areas, the RM will plan and ensure the implementation of the following activities:

1. Development of a legal framework following the Wildlife Law No 439/1995 to implement the legal provisions.
2. Development of a new biodiversity strategy based on the 5 goals and subsequent 23 targets of the post-2020 Global Biodiversity Framework that will ensure the following:

- restoration of terrestrial areas of high biodiversity value in 30% of the country's territory;
- a 15% reduction in the impact of invasive alien species;
- increasing the area of forests to 15% of the country's territory and protected areas to 10%;
- improved access to genetic resources;
- mainstreaming biodiversity into sectoral policies;
- ensuring biosafety of GMOs based on risk assessment;
- improved ecosystem services;
- reduce the risks of pollution and the negative impacts of pollution from all sources to levels that are not detrimental to biodiversity and ecosystem functions and services;
- ensuring access to the best available data, information and knowledge for policy-makers, practitioners and the public for effective and equitable governance, integrated and participatory management of biodiversity, and for enhanced communication, awareness-raising, education, monitoring and research.

3. It is necessary to re-evaluate state-protected natural areas by developing a methodology that establishes a procedure for designating areas of special interest for biodiversity at the national level, re-evaluate the areas established by BirdLife International, and assess other natural areas capable of protecting and conserving endangered species.
4. Ensure monitoring of flora and fauna species. However, there is no permanent comprehensive monitoring of avifauna in the RM. Winter waterfowl counts (International Waterbird Census), a very important scheme for long-term monitoring of waterbird species, are encouraged. Due to the fact that this census is conducted year after year in Moldova, it is practically the longest running biodiversity monitoring program in the country. Thus, the continuous implementation of this census provides the national and international scientific community with quality data sets that are always relevant and of great importance.
5. It is necessary to include targets for designation of areas of special interest for biodiversity in the draft Biodiversity Strategy and Action Plan for implementation by 2030 and provide financial support for implementation of these actions.

4.2.5. Recommendations (on flora)

Summarizing the information presented in the sectoral policy documents related to the crop production and soil resources sector, it can be concluded that the most effective measures contributing to the achievement of objectives and targets related to improving the condition of affected ecosystems, combating desertification/land degradation, promoting sustainable management of land and soil resources would be the following:

- use of lands according to their suitability for different agricultural uses, assessed on the basis of pedological studies and local relief and climatic conditions;
- introduction of a conservation agriculture system based on the introduction of soil conservation tillage (SCT) technologies: 'reduced-till' and 'no-till', using scientifically based crop rotation and a harmless system of fertiliser application and plant protection;
- use of sidereal (green) fertilisers (leguminous annual crops mixed with grasses);
- application of plant carbon to the soil between the growing seasons of major crops;
- incorporation of plant residues into the soil;
- increase of carbon content in the soil is ensured through the application of agricultural residues left in the field after harvesting the main crop;
- optimising fertiliser use: reducing the use of chemical nitrogen fertilisers and replacing them with green fertilisers will, above all, reduce GHG emissions;
- crop rotation: the use of crop rotation on slopes dominated by frequently sown crops can significantly increase soil carbon sequestration and erosion control;
- inclusion of leguminous crops in crop rotation: the inclusion of nitrogen-fixing leguminous crops such as beans, peas, soybeans, vetch, alfalfa and sainfoin in crop rotation reduces the need for nitrogen fertilisers, i.e. reduces associated greenhouse gas emissions, increases soil organic carbon content, and restores the structure and overall quality of the topsoil.

For the land use, land-use change and forestry sector, the relevant policy documents provide for restoration of disturbed ecosystems, reduction of greenhouse gas emissions, combating desertification/land degradation, promotion of sustainable development, in particular the following:

- restoration of the ecological-protective and bioproduction potential of existing forests by protecting rare and endangered forest ecosystems; conservation and improvement of habitat conditions
- extensive reforestation and reconstruction of degraded and unsuitable forests;
- expansion of forest vegetation areas by planting forests, forest belts, green areas, connecting corridors between forest areas, etc. on new lands (degraded; unproductive; excluded from agricultural turnover, etc.);
- conservation of forest biological diversity by bringing the system of protected areas in line with the requirements of representation of the whole range of forest ecosystems, integration of the problem of conservation of forest biological diversity into the design and practice of forest management;
- supplementing the criteria for forest functional zoning with elements related to the conservation of biological diversity, including forest genetic resources;
- prohibition of replacing local forests with introduced and exotic species without prior thorough testing;
- preservation of natural genetic diversity of all species of living organisms included in ecosystems and natural complexes;
- increasing the effectiveness of forest protection measures and protection of forest litter and forest vegetation outside the forest (forest belts, green areas, etc.).

4.2.6. Voluntary targets SO4

VOLUNTARY TARGETS RELATED TO STRATEGIC OBJECTIVE 4

- Develop 44 sustainable management plans for the state protected natural areas and core areas of the National Ecological Network.
- Develop the National Ecological Network by ensuring the management and protection of the elements of the National Ecological Network outside the state system of protected areas, update the list of core areas of the National Ecological Network and the Geographic Information System of the National Ecological Network.
- Establish a special regime for valuable ecosystems and ancient natural forests.
- Establish a wetland of international importance (Ramsar site) 'Padurea Domneasca' in the Middle Prut basin.
- Establish an Emerald Network as part of the Pan-European Ecological Network.
- Develop a cadastre of state protected natural areas.
- Increase the area of state-protected natural areas to 8% of the country's territory by 2025 and 10% by 2030.
- Establish a system of inventory and monitoring of endangered species and valuable habitats in the national ecological network.
- Identify and map the elements of the national ecological network necessary to ensure its functioning (ecological corridors, core and buffer zones, etc.).
- Ensure effective and sustainable management of natural ecosystems.
- Afforest 30,400 ha of riparian zones and strips protecting the waters of rivers and water bodies to create stabilising ecological elements on agricultural land and in forest ecosystems within the national ecological network.
- Promote scientific research on biodiversity conservation through the delineation of biogeographic units, promotion of new technologies and research on species and ecosystems.

SPECIFIC OBJECTIVE 5

TO MOBILISE FINANCIAL AND NON-FINANCIAL RESOURCES TO SUPPORT THE IMPLEMENTATION OF THE CONVENTION BY BUILDING PARTNERSHIPS AT GLOBAL AND NATIONAL LEVEL

5.1. Trends in bilateral/multilateral and international official development assistance

With the support of development partners, the Government of the Republic of Moldova has included the LDN concept in the following documents:

- *Land Reclamation Program for Sustainable Soil Resources Management for 2021-2025*, divided into implementation phases. The Action Plan for 2021-2023 envisages activities related to the integration of the LDN mechanism through soil reclamation, conservation, protection and fertility improvement works carried out to protect soils from the mechanical impact of water and wind, to restore moisture deficit (category including land irrigation), to prevent or remove excess water from the soil (category including dewatering and drainage), to restore soils (category including construction and operation of hydraulic engineering facilities).
- *The Regulation on the conditions and procedure for granting advance subsidies for land reclamation investment projects for implementation of the Land Reclamation Program for Sustainable Soil Resources Management for 2021-2025* establishes measures, conditions and procedure for granting advance subsidies for measures to prevent and control soil erosion (wind and water erosion) on agricultural lands affected by surface and deep erosion; measures for chemical improvement of saline soils; measures to preserve and improve soil fertility.
- *Law No 1041/2000 on Afforestation of Degraded Lands*, which establishes the legal framework for afforestation of degraded lands, the procedure for identifying such lands and sources of financing. The law defines degraded land is defined as land that, as a result of erosion, pollution or negative anthropogenic impact, has permanently lost its agricultural productivity but can be improved through afforestation and other ecosystem restoration works. In addition to the subject of afforestation, the Law establishes the procedure for identifying degraded land for afforestation and financing afforestation.
- *Rural Development Strategy for 2014-2020*, which aims to create a competitive, restructured and modernised agri-food sector with improved living and working conditions in rural areas. *Objectives*: to increase the competitiveness of the agri-food sector through market restructuring and modernisation; to ensure sustainable management of natural resources in agriculture through measures to support agricultural land and water management practices, environmentally friendly production technologies, organic production, including biodiversity, as well as adaptation and mitigation of climate change.
- *The draft National Agriculture and Rural Development Strategy for 2023-2030*, which conceptualises the development of a competitive agri-food sector focused on value chains with increased potential, environmentally friendly and climate-resilient, enhancing food security and safety, and improving the welfare and living conditions in rural areas. The Strategy defines three main strategic objectives that aim to strengthen the capacity of the agricultural sector to increase resilience to climate change, promote climate-smart, efficient and sustainable agricultural practices, develop the local market and increase export potential, and support sustainable socio-economic development of rural areas. The project ensures the implementation of Pillars 1 and 4 of the National Development Strategy 'Moldova 2030', respecting the commitments to implement the 2030 Agenda. This document ensures the implementation of the provisions of the EU-Moldova Association Agreement by aligning with the general objectives of the Common Agricultural Policy and is intended to ensure the continuity of initiatives in this field financed by external partners.

The strategic objective (SO) 5 aims to enable Parties to report quantitative and qualitative information on financial and non-financial resources dedicated to supporting the implementation of the Convention.

Tracking the allocation of financial resources by different actors is a difficult task in Moldova. In reality, there is no

single entity responsible for collecting information on the projects implemented to fulfil the obligations set out in the conventions. National private funding and donations not reflected in the Aid Management Platform. However, this information is not complete. The Ministry of Environment has embarked on an initiative to develop a tool to facilitate the collection of information from all actors involved in various areas of environmental protection.

SO 5-1 – Bilateral and multilateral public resources

This indicator focuses on resource flows between countries in the form of 'official development assistance' and 'other official flows'. Both providers and recipients of international official support use the OECD DAC system as a data source to which both providers and recipients can refer for relevant information.

Total amount USD		
Year	**Allocated**	**Paid/Received**
2016	**899805.63**	**1171555.63**
2017	**2751227.18**	**897252.66**
2018	**2131815.98**	**1440929.48**
2019	**5523154.10**	**564226.50**

5.2. Trends in domestic (national) public financial resources

Most of the domestic financial resources for the implementation of the convention to combat desertification were planned in the action plan for the implementation of the Environmental Strategy for 2014-2023.

The cost of the Strategy for the period 2014-2023 is estimated at MDL 9.1 billion, or MDL 910 million per year (1% of annual GDP). Data from the National Report on the State of Environment in the Republic of Moldova for 2015-2018, corresponding to the reporting period, were used for cost estimation. In the Gross Domestic Product (GDP), environmental protection expenditure in 2015-2018 ranged between 0.32 and 0.44%, and in the National Public Budget (NPB) between 1.03 and 1.21%, i.e. MDL 530.6 million in 2015, MDL 498.4 million in 2016, MDL 664.9 million in 2017 and MDL 618.3 million in 2018. These figures include expenditures from the state budget for the development and implementation of environmental policies; from local budgets for sanitation and environmental protection; and from the private sector for water, air and waste treatment plants.

Expenditures from the *state budget* include financing the activities of environmental authorities – MARDE and subordinate institutions, expenditures from the National Environmental Fund (NEF), the National Fund for Regional Development (NFRD) and external sources for environmental projects. NEF expenditures accounted for the largest share at 75% in 2015, 69% in 2016, 71% in 2017, and 77.5% in 2018. The resources were directed to areas such as environmental policy and management, resource conservation and management, access to water and sanitation, protection of air and soil resources, combating desertification and land degradation.

Expenditures from *local budgets* were directed to sanitation, landscaping and greenery, surveillance and environmental protection. According to the NBS, this expenditure doubled in 2017 compared to 2015, before falling by 34.6% in 2018. In the context of austerity in local budgets, the share of environmental expenditure remains low, despite the environmental challenges faced by local authorities that require investment to address.

The *private sector* utilises natural resources and contributes to environmental pollution. Hence, economic operators have invested in facilities to reduce the level of environmental pollution. According to the NBS, while the private sector invested MDL 39.8 million in 2015 and MDL 51.9 million in 2016, these investments increased 8 times in 2017 and 7 times in 2018 compared to 2015, indicating an increased awareness of the business environment and the implementation of mitigation measures.

At the national level, the implementation of Convention-related measures has not been consolidated into a single commitment document, and various measures are included in sectoral policy documents (such as the Agriculture and Rural Development Strategy, the Environmental Strategy and the Biodiversity Conservation Strategy). The Republic of Moldova is in the process of transition to a program-based budgeting approach. During the period under review, financial control over the implementation of environmental strategies was not possible, as implementation reports focused on results achieved rather than on the allocation and expenditure of resources.

In *conclusion*, we note that the indicator 'Environmental Protection Expenditures' continues to be low. Public authorities, organisations, institutions may have expenditures that include environmental components but are

not separately accounted for in the accounting records. Similarly, information on environmental expenditures in the private sector is apparently not fully reported by all companies. The external contribution is very limited (1% of total environmental expenditure) and decreases every year due to lack of absorptive capacity. The state's share in financing environmental strategies and programs remains quite low compared to current needs, and local authorities are severely underfunded to address environmental issues at the local level. Even the funding from the NEF goes mainly to social projects and to a lesser extent to waste management, biodiversity, environmental education and environmental quality improvement projects.

5.3. Future support for activities related to the implementation of the Convention

Strengthen monitoring, assessment and reporting on policies related to desertification, land degradation and drought mitigation through the following methods:

- Collect and store data according to a single principle so that they are standardised, homogeneous and can be easily incorporated into different national and international reports.
- Develop a plan for co-operation between relevant institutions to facilitate data sharing.
- Establish a national monitoring system adapted to the international one.
- Launch a campaign to standardise national indicators.
- National systems, methodologies for classifying indicators should be in line with international ones.
- Agencies involved in data collection and analysis must receive annual ongoing training on the implementation process to be ready for national reporting, which is done every 4 years.
- Adjust the national legal and regulatory framework in this area.
- Organisation of meetings by the Convention secretariat to prepare national experts for the reporting process for each objective.
- Raise public awareness on desertification and drought (seminars, contests, etc.).

A number of difficulties have been identified in the Convention reporting process, the most important of which are:

- Lack of an information portal on relevant environmental information;
- Lack of a database on land cover in the RM and data on the process of combating desertification and ensuring neutrality of land degradation;
- Motivational aspects of the work and competencies of the multidisciplinary team composed of professionals from different institutions aligning their priorities with the requirements of the Convention;
- Institutionalise processes of coordination and cooperation between agencies, relevant institutions and the socio-academic environment in the Convention reporting process;
- The quality and hierarchical position of the Working Group members in their institutions/agencies. We need decision makers who are team players so that they have the political will to implement the proposed recommendations.

The national reporting process, as an indispensable tool for the effective implementation of the Convention and the achievement of strategic objectives at the global and national levels, should be communicated to the public and to national and local environmental authorities. In this regard, the UNCCD Working Group will systematise the information submitted to UNCCD and detail the data calculations in accordance with the methodology outlined in the Reporting Manual: https://prais4-reporting-manual. readthedocs.io/en/latest/index.html, in order to prepare and publish the Narrative Report on the process of combating desertification and ensuring land degradation neutrality in the Republic of Moldova for the last 4 years (reporting period). The comments of other experts and the UNCCD Secretariat on the data and information presented in the Implementation Framework, together with the default national estimates provided through the PRAIS forms, should be deciphered and analysed in terms of progress made and development priorities identified for the next 4 years.

VI. CONCLUSIONS AND GENERAL RECOMMENDATIONS

6.1. Conclusions

1. The process of land degradation is accompanied by the expansion of built-up land (expansion of man-made landscapes) at the expense of forested or vegetated land (natural landscapes).
2. The change in carbon stocks over the baseline period indicates the prevalence of stability in the area, with stocks increasing when land is converted from agricultural land to forested land and decreasing when it is converted back. More forests, grasslands and wetlands are needed, as well as tighter controls on the expansion of land used for construction.
3. Improving access and quality of water for the country's population is limited due to deteriorated infrastructure, pollution and limited water resources. The worst situation is in rural areas, where the main source of water is wells, which do not meet sanitary standards in terms of chemical composition of water.
4. Moldova is exposed to a number of natural hazards and climate risks, the impact of which disproportionately affects the country's population. About 30% of the country's population, especially the rural population, which is totally dependent on agricultural activities, have been severely affected by the droughts of recent years. The standardised SPI index (at least for the conditions of the RM) is not the most appropriate tool for drought hazard assessment. The country's territory was less exposed to drought risk during the reporting period (as measured by PRAIS4) than in previous years (which is not true). Moderate droughts occur about once every 5 years, severe droughts have occurred 5 times between 2000 and 2019, and extreme droughts have occurred 2 times (2011, 2015).
5. There is no database of key biodiversity areas (KBAs) at the national level. The anthropogenic impact on the biodiversity of the RM is enormous, as agricultural land accounts for 75% of the total area, and there are practically no areas completely untouched in terms of fauna and flora.
6. During the reporting period, financial control over the implementation of environmental programs and strategies was not possible, as implementation reports focused on results achieved rather than on the allocation and expenditure of resources. Public authorities, organisations, institutions may have expenditures that include environmental components but are not separately accounted for in the accounting records.
7. The quality of data generated by PRAIS4 is lower (with a spatial resolution of 250 m) than the national data, as evidenced by the areas occupied by grasslands in 2019 (PRAIS4 data indicate an area of 122 thousand ha, while the Land Cadastre of the RM indicates 340 thousand ha).

6.2. Recommendations

1. Stricter control by the authorities over the expansion of forests, grasslands and wetlands is needed, as well as tighter control over the dynamics of built-up areas.
2. Forests are important sinks of organic carbon and their expansion could lead to a significant increase in these stocks.
3. To improve public access to quality and safe water resources, it is recommended to develop and implement rainwater harvesting and utilisation systems, implement wastewater treatment systems using constructed wetlands (CW), etc.
4. Moldova needs to implement a comprehensive reform program aimed at improving drought risk preparedness, investing in mitigation and further strengthening disaster response. In the drought impact assessment process, multi-criteria analysis (based on several drought risk indicators, not just SPI) should be applied to get a realistic picture for drought risk assessment.
5. It is necessary to develop management plans for state-protected natural areas and core areas of the National Ecological Network.
6. In the period between reports, continuous expert input is required to prepare the necessary data, review the methodology, etc. In this respect, the implementing unit should ensure control and coordination of the data flow and changes in methodology.
7. It is recommended to switch to the use of national data, which are much more accurate than those generated by PRAIS4. It is recommended that land cover maps for the Republic of Moldova be produced and used instead of default data.

6.3. Implementation framework

Degradation of land and natural resources due to biophysical and socio-economic factors, largely influenced by climate change, is one of the most serious challenges facing our country.

Combating desertification and restoring degraded land is vital for Moldova to achieve a number of national and international priorities in mitigating climate change, improving living conditions, reducing desertification, restoring ecosystems and conserving biodiversity.

In this context, the Government of the Republic of Moldova, together with civil society, the associative and private sectors, will support actions and initiatives aimed at strengthening the land development management process, ensuring land degradation neutrality, and preventing and mitigating the effects of drought, according to the following priorities:

1. INSTITUTIONAL CAPACITY

- Support national capacities to measure and monitor land-use change, including land degradation and desertification, through the use of new information and communication technologies (mobile phone applications, cloud services, ground sensors, drone imagery, etc.).
- Strengthen national capacities to align international commitments in the field of land development under various conventions whose implementation is under the responsibility of different ministries and administrative bodies or national representations of international organisations with competence in this field.
- Raise awareness among national institutions of the importance of secure tenure and the implementation of voluntary guidelines on responsible land tenure governance in the context of national food security to promote sustainable land management practices and participatory land-use planning processes.
- Design and develop new national and local indicators to find synergies between sustainable development goals and institutional commitments that promote integrated approaches to land development management.
- Facilitate capacity-building and technology transfer on desertification issues; promote and establish multi-stakeholder expert working groups.
- Strengthen dialogue between scientists, policy makers and land users to find comprehensive and integrated solutions that can help increase the resilience of the entire value chain to multiple challenges.
- Awareness raising, capacity building and training in sustainable land management, advisory services, expanding agriculture and access to agricultural services for producers and land users.

2. POLICY FRAMEWORK

- Promote gender-responsive actions to implement a legislative framework for sustainable land management to ensure land degradation neutrality.
- Create an environment of cooperation between all parties involved in the land management process to share information and innovative technologies.
- Identify entry points for enhancing stakeholder participation in the implementation of land degradation neutrality targets at the subnational level, including from a gender perspective.
- Promote and mainstream the concept of sustainable management and land degradation neutrality into national economic policies to stimulate investment and improve access to alternative market dynamics.
- Reflect the principles of responsible land tenure governance in national policies so that property rights are recognised, enforced and protected.
- Strengthen national capacities to align international commitments on sustainable land management, land degradation neutrality and drought prevention in national, sectoral and local policy documents.

3. GOVERNANCE AND MANAGEMENT OF NATURAL RESOURCES

- Promote sustainable land management and integrated ecosystem management approaches that are essential for achieving land degradation neutrality and country adaptation.
- Strengthen natural resource processes and actions and property security to direct land use planning to the landscape or protected area level.
- Mobilise innovative sources of finance to support the implementation of activities to combat desertification and ensure land degradation neutrality for sectors affecting the livelihoods of vulnerable local populations.
- Monitor and evaluate the process of implementation of the concept of sustainable land management. Continuously adjust, based on relevant data and monitoring, initiatives to combat desertification and ensure land degradation neutrality.
- Publish and disseminate data and information on the effectiveness, associated benefits and risks of spontaneous/unanticipated response options for improving land use efficiency.
- Promote additional national and sub-national indicators to effectively monitor progress along the chain to accurately assess progress at different scales.
- Develop locally adapted mechanisms to facilitate condition assessment and improve decision-making on social and environmental issues.
- Collect, compile and share information to raise awareness of how the benefits of achieving sustainable land management can be increased through sustainable consumption and production flows, models, practices and technologies.

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