Republic of Moldova

National Land Degradation Neutrality Targets

2018

The overall goal of this document is to present the results of downscaling the SDGs target 15.3 **"By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation-neutral world"** and to contribute to raising awareness and engaging with the key stakeholders and decision-makers to create a participatory approach in establishing a resilient framework for land sector sustainability in the Republic of Moldova.

The Program, which initiated a wide national consultative process for sustainable land management, was an opportunity to analyze the current land resource use/planning and prioritizing actions with regard to scientific and technical data, capacity building, resources, awareness raising, needs in terms of policy coherence and coordination to ensure an effective implementation and strengthen UNCCD reporting process in the Republic of Moldova. Based on the systems design approach and supported by the comprehensive biophysical baseline information, the Program is a critical input for developing national land sector related policy initiatives.

PREȘEDINTELE REPUBLICII MOLDOVA
PRESIDENT OF THE REPUBLIC OF MOLDOVA

DECLARATION
about the policy implications and main interventions at the
Land Degradation Neutrality (LDN) in the national environment
and development context of the Republic of Moldova

Land degradation is a great challenge for all sectors of development in the Republic of Moldova. It has created increased and wide-ranging environmental and development impacts related to reduction in resilience and functional integrity of the agro ecosystems and severe decline soil fertility. Currently 26% (about 880,000 ha) of the total area of the country are degraded. Annual loss rate of productive lands and fertile soils in the Republic of Moldova is of 6,400 ha and 26 million tones, respectively.

In this context the Republic of Moldova is undertaking great efforts to strengthen the policies on land protection and to restore of degraded lands. The SDGs Target 15.3 „By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world" is among the priority for the Republic of Moldova. At this backdrop, the Republic of Moldova has joined to the global initiative of the United Nations Convention to Combat Desertification, on Land Degradation Neutrality in 2016 with an objective to support nationally LDN target setting process aimed at prioritizing effective policy interventions to halt land degradation and to restore of degraded lands. The following national LDN target is proposed as the result of the national consultative process:

Improving land/soil conservation and ecological restoration of degraded lands and farmland buffer strips up to 100% to achieve by 2030 no net loss of productive land/soils and increase resiliency, adaptation capacity and biodiversity services of agricultural ecosystems.

Main interventions in line of promoting land sector sustainability and to achieve nationally downscaled Development Agenda 2030 provide for:

- creating a special „recovery fund" for an ecological restoration and improving condition and quality of about 880,000 ha of degraded land;
- creating the green belt of farmland buffer strips for land and soil conservation to reach the science-driven proportion of farmland buffer strips from total area of agricultural lands;
- increasing the national forest cover up 15% to promote land sector sustainability and to contribute to increasing biodiversity services and carbon stocks in a changing climate;

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- remediating of 1,588 contaminated by persistent organic pollutants sites and prevention of new accumulations of pesticides, other hazardous substances and chemicals.

LDN policy efforts will have a significant implication in regional climate change as part of the carbon inventory requirements and biodiversity services conservation. The measures on increasing national land sector sustainability will promote to rising carbon dioxide removal capacity in the national land use and land use change sector by 25%.

In this context, achieving the regional climate change and biodiversity agenda depends heavily on successful LDN implementation supported by strong governance and wide stakeholders involvement at the national scale.

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CONTENT

WHAT IS LAND DEGRADATION NEUTRALITY?

Land resources are degrading at an alarming rate, creating a challenging environment for all development sectors. Target 15.3 of the Sustainable Development Goals (SDGs) responds to this serious challenge and sets out a new global ambition: to achieve a Land Degradation Neutral World by the year 2030. Pursuit of Land-Degradation-Neutrality (LDN) requires effort to avoid further net loss of the land-based natural capital relative to a reference state, or baseline. So, the first objective of the LDN target is to inspire countries at regional and national levels to assess current land resource use and planning. This would allow them to establish suitable baselines for monitoring progress, evaluating trade-offs and prioritizing action at the appropriate scale.

In the LDN conceptual framework, **the minimum target** equals the baseline since the ambition of a country with respect to achieving LDN is no net loss of the land-based natural capital. Using another wording, the minimum goal is to stabilize the negative trend of the initial numerical value of the specific indicators (used as proxies of the land-based natural capital) and achieve an equilibrium of their dynamics relatively of baseline values.

Tracking progress towards LDN can be communicated in terms of increased productivity, vegetative cover, biodiversity and ecosystem services, and the resulting socio-economic benefits. The minimum set of the indicators recommended for monitoring progress towards LDN are: **land cover, land productivity and soil organic carbon (SOC) stock.** Together the three indicators provide good coverage of the condition of land-based natural capital and ecosystem services that are provided from that land base (UNCCD, 2017).

LDN is a flexible target and can be implemented at local, regional or national scales. It recognizes and comes from the government ownership on establishing national LDN agenda to manage the trade-offs and to capitalize on the synergies between biological and economic productivity. Using a landscape approach, investments in land rehabilitation LDN can advance the achievement of other SDGs, such as poverty reduction, food and water security, biodiversity protection, and climate change mitigation and adaptation. For example, the carbon sequestration potential of reforestation and restoring only 61,500 of degraded lands in conditions of Moldova makes up to 154,000 tons annually, or 2,13 $MtCO_2$ for the period till 2030 (Talmaci, 2017). It also promotes resiliency against drought and water scarcity and reducing rural vulnerability.

With a high concentration of rural population, both poor and dependent on income from agriculture, the LDN target is a highest priority for the Government of Moldova. The Republic of Moldova has joined the Land Degradation Neutrality (LDN) global initiative of the United Nations Convention to Combat Desertification (UNCCD) in May, 2016, with an objective to prioritize effective policy interventions **"to achieve by 2030 no net loss of productive land/soils and increase drought resiliency, adaptation capacity and biodiversity services of agricultural ecosystems."**

COUNTRY CONTEST

The Republic of Moldova is a landlocked country (except for a 200 m direct river-sea exit in the south of the country where the Danube forms part of the border). Located in the South-Eastern part of Europe, between Ukraine and Romania, Moldova has a temperate continental climate and high productivity agricultural black soils. It spans 350 km from North to South, and 120 km from West to East. Most of the territory is a moderate hilly plateau with a 100-200 m average elevation cut by many streams and rivers and semi-arid steppe plains in the south with the highest insufficient water conditions in the country.

The Republic of Moldova has 37 first tier units: 1 autonomous territorial unit (Gagauzia), 1 territorial unit (Transnistria); 3 municipalities (Chisinau, Balti, Bender) and 32 districts *("rayons")*. The Republic of Moldova, having unique land resources and high productivity of soils potential, is characterized by high landscape utilization. Major human impact on Moldovan landscape is through agricultural activities covering about 74% of the landscape area (Leah, 2016a). Wines, cereal grains, corn, fruit, vegetables, walnuts along with various other Moldovan agri-food products are well known in the world. At the same time, the natural and socio-economic subsystems of the Republic of Moldova are highly vulnerable to desertification and land degradation processes owing to the high-level physical exposure as well as insufficient capacity to manage environmental risks.
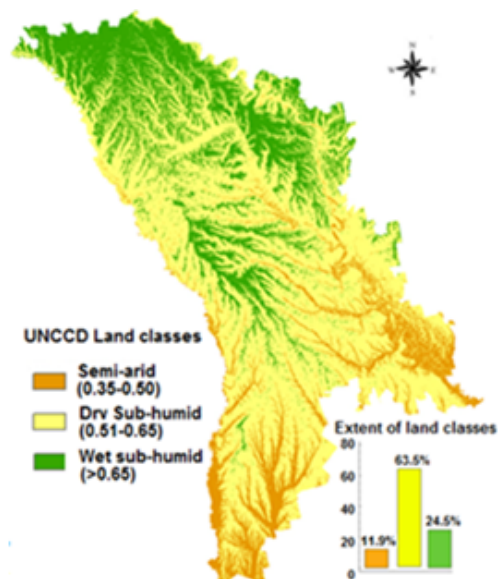
Figure 1. Extension of drylands in Moldova Source: Daradur et al., 2015

Facts and figures	
➢ *Moldova has an agri-industrial economy with high reliance on remittances;* ➢ *Population "is home" to 3.6 mln.;* ➢ *22% of the population resides outside the country, compared with a 3.1% global average;* ➢ *Agriculture employs 28% of the population and makes up about 15.5% of Moldova's GDP;* ➢ *Poverty remains mainly a rural issue: about 80% of poor people are rural population;* ➢ *About three fourths (75.5%) of Moldavian territory located in drylands;* ➢ *More than 85% of the population of Moldova dwell in the drylands* ➢ *Moldova has the lowest forest cover (13.7%) in Europe;*	➢ *Land degradation is a great challenge for all development sectors of Moldova;* ➢ *Total damages estimated at 251 mln. $US annually;* ➢ *Directly hit smallholder farmers whose income is 40-70% comes from agriculture;* ➢ *Around 42% of agricultural lands or 953,900 ha are degraded;* ➢ *Land degradation changed the emissions abatement status of the agricultural lands from removal to CO_2 emissions source.* ➢ *Droughts, accounting for 13% of total number of climate hazards, make up 67% of total cost of climate-related risks;* ➢ *Drought 2007 with a return period of more than 200 years had a dramatic impact and estimated loss of about US$1 billion;*

SUMMARY

Land degradation creates a challenging environment for all sectors of development of the Republic of Moldova. Due to high-level physical exposure, aggravated by overexploitation of land resources and poor adaptability of applied agricultural practices, land degradation has created an increased and wide-ranging environmental impact related to severe soil fertility decline and reduction in resilience and functional integrity of the agro-ecosystems.

The SDGs Target 15.3: "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world" is of highest priority for the Government of Moldova. The Republic of Moldova has joined the Land-Degradation-Neutrality (LDN) global initiative of the United Nations Convention to Combat Desertification (UNCCD) in May, 2016, with the objective to support the national LDN target setting process aimed at prioritizing effective policy interventions to halt land degradation and to restore of degraded lands.

Governmental leadership and stakeholders' engagement was recognized as the most challenging in the specific conditions of Moldova. The activities for leveraging the country LDN target setting process were identified and the country LDN leverage Plan was accepted. In general, the government ownership on establishing the national LDN agenda was ensured.

The National LDN Working Group (LDN WG) has been established for steering the LDN TS process and LDN mainstreaming into national planning documents. The national LDN WG provided a high-level multi-stakeholder platform to secure active participation of key stakeholders. The national LDN WG includes 20 experts and policy specialists, who are delegated as representatives from governmental organizations (line ministries, national land use planning, agriculture, environment and forestry, statistics), the private sector (farmer organizations, land-based companies), CSOs. Government leadership and multi-stakeholders engagement creates a collaborative and synergetic framework for monitoring and evaluation of the LDN implementation. The activity of the LDN WG and the implementation of its decisions are coordinated by the UNCCD National Focal Point.

National data on land use/ change were used to obtain baselines estimates and the **trends in the change of SOC stocks suitable for LDN target setting at the country level.** The LDN WG noted that with the use of default remotely sensed data, spatially explicit land cover information in Moldova has become more readily available and relatively easy to use. However, an examination of disparate sources of spatial data (e.g. remotely sensed satellite data, historical agricultural statistics, etc.) during the baseline validation process, has reviled an inconsistency of default and national land cover/use change datasets.

The most striking feature of the long-term land cover/use change is a decrease of natural ecosystems with transformation to agricultural lands. This modification of natural lands has resulted in a great mosaic of land cover patterns with a changing structure and functionality of ecosystems by alteration of the soil organic carbon (SOC) and eco-systems productivity. Moldova's predominant land cover remains overwhelmingly agricultural, while farming is the dominant land use activity.

Default stocked SOC data (ton/Ha) used for 2000. To obtain the estimates of the annual net SOC change beyond of 2000, the methodology for compiling National Greenhouse

Gas Inventories was employed. In the absence of the national Land Productivity Dynamics (LPD) estimates and in order to comply with the UNCCD monitoring requirements the default LPD information was combined with the national land cover/use dataset.

The post-Soviet land reform (1991) has cardinally changed the land ownership and tenure system and increased land degradation, mainly due to using unsustainable land practices. It is primarily conditioned by loss Soil Organic Carbon (SOC). While in the forest sector the respective decreasing SOC in the middle of 1990-es stabilized and even converted to positive dynamics, cropland category has experienced a catastrophic loss in soil carbon that led to the transition from a positive carbon balance (+0.56 t/ha in 1990, before the land reform was initiated), to a profoundly negative balance at the current time (-0.60 t/ha in 2010).

Land degradation had synergetic impacts and significant implications as part of the carbon inventory requirements in a changing climate and biodiversity services conservation. Soil organic carbon loss resulted in decreasing net carbon stocks and, respectively to increasing CO_2 emissions and led to changing (in the middle 1990-s) the agricultural lands status from removal (sink) to emissions CO_2 source.

Intensive use of land and poor adaptability of agricultural practices in a changing climate and ineffective risk governance are the main driving forces leading to an increased and wide-ranging impact of environmental degradation in the Republic of Moldova related to severe soil fertility decline and reduction in resiliency and functional integrity of the agro-ecosystems. Increased exposure to land/soil degradation and drought hazard and their translating into a great risk for all development sectors of the Republic of Moldova can be attributed also to poverty and high rural vulnerability.

The Program established an LDN target setting approach and outlined the main intervention to promote land sector sustainability. The downscaling and alignment of LDN targets with national polices provided for an adaptation existing national targets to ensure consistency between SDGs and other global initiatives and national circumstances to capitalize previous country land sector target-setting efforts. At the same time, the approach ensures a high relevance to government priorities in land-sector and rural sustainability.

The overall voluntary LDN target of Moldova is "**to achieve by 2030 no net loss of productive land/soils and increase drought resiliency, adaptation capacity and biodiversity services of agricultural ecosystems".** It was endorsed and transparently communicated at the national and international levels. The National LDN agenda integrates global obligations of the Republic of Moldova and ensures a high relevance and clear policy implications to government land-sector priorities, capitalizing the previous country land sector target-setting efforts.

> **LDN related main interventions**
> ➢ *creating a special "recovery fund" for an ecological restoration and improving condition and quality of degraded land;*
> ➢ *complementing Moldova's greenbelts plans that protect valuable farmland areas;*
> ➢ *increasing the national forest cover up 15% to promote land sector sustainability and to contribute increasing biodiversity services and carbon stocks in a changing climate;*
> ➢ *remediating of 1,588 contaminated by persistent organic pollutants sites and prevention of new accumulations of pesticides, other hazardous substances, and chemicals.*

1. LEVERAGING LAND DEGRADATION NEYTRALITY: National agenda and main policy documents to be aligned

SDGs and national land sector sustainability

A number of strategies, programs and projects that support land protection and the restoration of degraded lands to improve biodiversity services in a changing climate have been approved recently in the Republic of Moldova. Often the policy papers overlap and contradict each other and are not clearly shared and integrated into the budgetary planning processes. Limited internal financial resources place the Government in a vulnerable state, make it dependent on foreign donor priorities. The lack of political clout of the environmental authorities is going to be a continued barrier to enhance for the LDN conceptual framework implementation.

Figure 2. SDGs alinment with policy documents in the Republic of Moldova.
Source: Government of the Republic of Moldova, 2017

Currently, the national SDGs policy agenda is partially downscaled and one-third of SDGs targets are not even included in any of the national policy papers. The analysis of national policy papers and their comparison with SDGs showed that the highest level of alignment relates to the "environmental" objectives: 8 out of 28 SDGs numeric targets are aligned to the relevant national strategies; 20 environment-related targets are partially aligned (7) or have not yet aligned at all (13).

The SDG 15 **"Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss" includes** 9 targets (the target 15.4 on the conservation of the mountain eco-systems are not relevant to country). SDG 15.1, 15.3 and 15.5 refer to the sustainability of ecosystems and biodiversity services, land and soil degradation, and biodiversity conservation that respectively strongly relate to the global UNCCD's LDN principle and the and Biodiversity Targets adopted by the Convention on Biological Diversity. In particular, Aichi Target 15 includes a relevant quantitative target, stating that 'by 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification'.

LDN national agenda

With the majority of the rural population, both poor and dependent on the agricultural sector for their livelihood, land sector sustainability and increased drought resiliency are the highest priority for the Government of Moldova. Land degradation and drought directly hit smallholder farmers, which are the majority, and whose 40-70% income comes from agriculture. Total damages from land degradation processes estimated at 251 mln. $ US annually. Droughts, accounting for 13% of the total number of climate hazards, make up 67% of total cost of climate-related risks (Daradur et al., 2014). The only drought of 2007, with a return
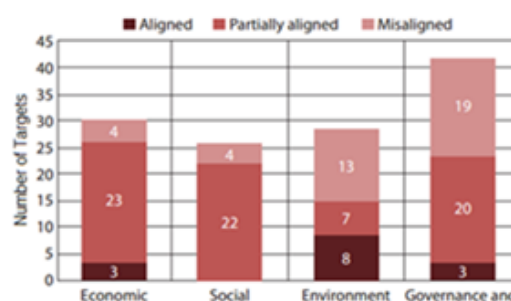
period more than 200 years, had a dramatic impact and estimated loss of about US$1 billion (23% of GDP).

The SDGs Target 15.3 "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world", therefore, is the priority for the Republic of Moldova. At this backdrop, the Republic of Moldova has jointed to the global initiative of the United Nations Convention to Combat Desertification (UNCCD), on Land-Degradation-Neutrality (LDN) in May, 2016, with an objective to support the nationally LDN target setting process aimed at prioritizing effective policy interventions to halt land degradation and to restore degraded lands. The SDG 15.3 is under the mandate of the Ministry of Environment and the newly established **Ministry of Agriculture, Rural Development and Environment (MARDE)** will remain the key institution to be engaged in aligning the target with the national strategies, as well as for the achievement of downscaled targets.

Nationalization of the SDG 15.3 and its alignment with national policies provided for an adaptation existing land sector related targets to ensure consistency with SDGs and other global or national targets, and to capitalize on previous country target-setting efforts to boost land sector sustainability. At the same time, the approach ensures a high relevance to government priorities in the Moldavian land-sector and clear policy implications.

As the result of the consultative process, the following Nationally downscaled LDN target of Moldova was endorsed and communicated at the national and international levels has been formulated: **"Improving land/soil conservation and ecological restoration of degraded lands to achieve by 2030 no net loss of productive land/soils and to increase drought resiliency, adaptation capacity and biodiversity services of agricultural ecosystems".**

Main policy documents to be aligned

In the table below the main policy documents to be considered and amended under the UNCCD/LDN aligning process, and the main institutional arrangements to be undertaken are summarized.

Table 5. Main policy documents to be aligned

Related SDG 15 targets	National-scaled target description	Policy/program alignment with downscaled targets and relevant indicators	Key institutions
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to	*Improving land/soil conservation and ecological restoration of degraded lands and farmland buffer strips up to 100% to achieve by 2030 no net loss of productive land/soils and increase resiliency,*	***Environment Strategy for 2014 - 2023*** *Improving soil quality and ecological restoration of degraded lands affected by landslides as well as farmland protection strips; sustainable management and protection of useful mineral resources. (total 9 billion MDL)* ***Program for soils conservation and increase soils fertility for the***	*Ministry of Agriculture, Rural Development and Environment, Institute of Pedology, Agrochemistry and Soil Protection, State Hydro-meteorological Service, Academy of Science of Moldova, Agency for Cadastre* *Ministry of Agriculture, Rural Development and*

achieve a land degradation-neutral world	*adaptation capacity and biodiversity services of agricultural ecosystems.*	***years 2011-2020*** *Implementation of measures to stop soil degradation and increase soil fertility through modernization and expansion of land reclamation, implementation of modern technologies and environmentally friendly agricultural practices.*	*Environment, Institute of Pedology, Agro chemistry and Soil Protection Agency for Land Relations and Cadastre, Branch institutions, Ministry of Environment, Agency "Moldovan Waters"*
		Conservation agriculture program for the years 2014-2020 *Promoting conservation agriculture system in adapted versions of soil conditions and requirements of major crops in the region to ensure competitive production quantity and quality, with lower costs and higher profit in terms of improving soil characteristics and functions within agroecosystems, enlarged reproduction pedogenesis process and environmental protection.*	*Ministry of Agriculture, Rural Development and Environment, research institutions under MAFI, State University of Moldova, State Agrarian University of Moldova*
		National Plan for Forest Vegetation Extension 2014-2018 *(Approved by GD 101/2014). The plan envisages reforestation of 13,000 ha in total of degraded lands and water protection forest belts, including maintaining forest plantations and ensuring their protection against illegal logging, illegal grazing and prevention of other transgressions*	*Ministry of Agriculture, Rural Development and Environment, MAFI, LPAs to contribute through land allocation for forestation and reforestation. Moldsilva in cooperation with Academy of Sciences.*

A SWOT analysis

The LDN target setting process and related awareness and communication activities allowed facilitating expert debates about the possible solutions to the main constraints related to the implementation of the LDN approach in the Republic of Moldova. An analysis, represented below in the text form as well as in a shorter form of a matrix, used a strategic planning approach to evaluate the Strengths, Weaknesses, Opportunities, and Threats (SWOT) related to legal and institutional framework in relation the country level implementation of LDN TSP. The SWOT analysis aimed at identifying and assigning factors, either positive or negative, to develop a structured comprehensive understanding of the main factors that determine the implementation of the LDN approach in the specific country conditions of the Republic of Moldova.

Strengths:	Weaknesses:
Environmental - Fertile soils and the favorable temperate climate; **Institutional** -Commitments to the promotion of green economic development, including sustainable agriculture; - Land degradation issues in line with the recent sectoral development strategies and programs; - Numerous programs and projects to promote afforestation and reforestation, land restoration and carbon sequestration; **Policy, Legal and Regulatory** - Medium and long term strategic vision to accelerate environmental protection with European standards; - The priority attention of land use regulation to the land/soil protection issues; **Economical and financial** - Introduction of the Medium-Term Expenditure Framework (MTEF) and improving coherence environmental protection policy and allocating finance;	**Institutional** - Weak governance and institutional capacity; - Limited experience in strategic planning; - Limited availability of technical and business management skills; - Poor coordination at the institutional level; - Lack of effective coordination of donors; **Policy, Legal and Regulatory** - Sector-based approach; - Lack of incentives for private investors; - Unclear regulatory framework on the roles of Local authorities in the land protection; - Ineffective market-based instruments for pursue green, clean or low-carbon investments; **Economical and financial** - lacking of clear environmental priorities in budget process; - Reduced availability of financial resources;
Opportunities:	**Threats**
Institutional - Avoiding narrow sector-focused strategies that lead in a fragmented policy framework, unclear priorities and dispersed public budgets; - contributing to the resilience agriculture and rural sustainable development; **Policy, Legal and Regulatory** -Improving policy coherence; - Enforcing SLM and rural development sound policies; - Striving participatory approach with involving individuals and stakeholders; - Moving away from narrow sector-focused strategies; **Economical and financial** - Developing linkages between planning and financing; - Improving the investment and business climate;	**Environmental** - Global environmental challenges in a changing climate; **Institutional** - A complex, multi-dimensional system challenge of land degradation issues; - Lack of coordination and synchronization of policies and activities; - High upfront capital costs, long investment timelines, and difficulties to access loans; - Insufficient financial support; **Policy, Legal and Regulatory** - Lack of clear Local authorities' responsibilities in solving land degradation issues; - Unfavorable business and investment climate; - Political uncertainty regarding consistency of policy and strategy **Social, information and awareness** - SLM not seen as a shared social responsibility; - Lack of political clout of the environmental authorities; - Inadequate information by the private actors at the local level; - Fragmented land ownership; - Significant rural depopulation;

2. ASSESSING LAND DEGRADATION NEUTRALITY

Land use change and land/soil degradation (baselines, trends and driving forces)

Six main land cover categories - forests, grasslands, croplands, wetlands and water bodies, artificial areas and bare lands were considered. The European Space Agency's (ESA) Climate Change Initiative Land Cover dataset (CCI-LC) was used as default source of land cover data. With the use of default remotely sensed data, spatially explicit land cover information, Moldova has become more readily available and relatively easy to use the land-related dataset. However, an examination of disparate sources of spatial data (e.g. remotely sensed satellite data, historical agricultural statistics, etc.) during the baseline validation process, has reviled an inconsistency the default and national land cover/use change datasets since the resolution of the European Space Agency's CCI-LC approach could not capture in details the tiny particularities and great mosaic of land cover patterns of Moldavian landscapes.

In the report, the national data on land use and change were used to obtain baselines estimates and the trends in the change of SOC stocks suitable for LDN target setting at the country level. In order to comply with the UNCCD monitoring requirements on the Land Productivity Dynamics (in the absence of the national LPD estimates) the default LPD information was combined with the national statistics land cover data source. Considering the differences between the national and default land cover information and assuming that the Net LPD default trends really describe the dynamics of the Land Productivity within land cover categories, we transformed default absolute estimates on LPD classes (area in sq.km or th. ha) to a percentage against the default total area reported (3343.4 thousand ha). Then, this percent covered by specific LPD class for each land cover categories were converted to absolute area units following national land cover data source (3384.6 thousand ha).

Land use/change

An assessment of land degradation trends coupled with an analysis of the driving forces behind these trends is an essential step in terms of understanding the current environment of land degradation and setting science-driven LDN targets. Moldova's lands have undergone considerable alteration over the past last 200 years with the most striking feature in an increase in agricultural land. Starting with the 19th century and during almost all 20th century natural forest and meadow ecosystems have undergone significant changes by being transformed in vast arable lands as part of the itinerant agriculture way of managing lands. This modification of natural land cover has resulted in a great mosaic of land cover patterns (Leah, T.
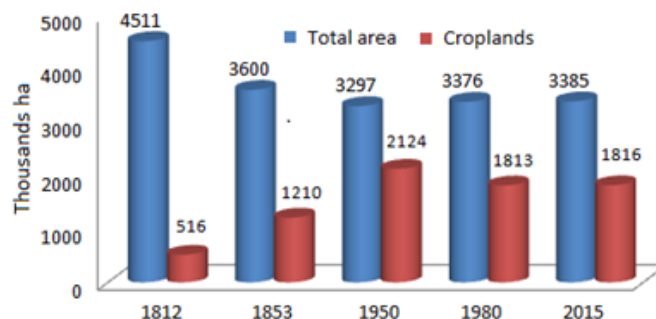

Figure 3. Modification of natural land cover in the Republic of Moldova (1812-2015).
Source: Daradur et al., 2014

2016b). The resolution of the European Space Agency's CCI-LC approach could not capture in details such tiny particularities of Moldavian landscapes.
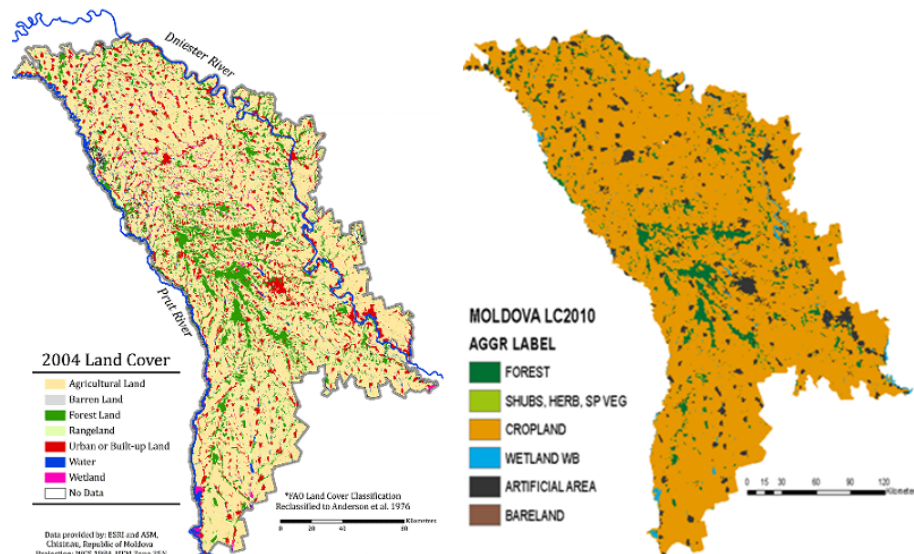

Figure 4. Land cover with different resolution approach (Republic of Moldova)
Source: Shaker, 2018; ESA CC-LC, 2016.

An examination of disparate sources of spatial data (e.g. remotely sensed satellite data, historical agricultural statistics, etc.) during the baseline validation process, has reviled an inconsistency of the default and national land cover/use change datasets. National LDN Working Group recommended using the national dataset on land use and change for obtaining baselines estimates and the trends in the change of SOC stocks suitable for LDN target setting at the country level.

Moldavian predominant land cover remains overwhelmingly agricultural, while farming is the dominant land use activity. The most noted changes in recent (1990-2015) land cover/use structure is an increase of forest areas (+42.7 th. ha or by 12%), artificial lands (+8.3%) and wetlands and water bodies (+8.1%).

Table 1. Land use/cover change, th. ha (1990-2015)

Land Category	Indicator, th. ha				Difference, 2000-2010		Difference, 2000-2015	
	1990	2000	2010	2015	th. ha	proportion, %	th. ha	proportion, %
1. Forest	371,4	372.30	411.07	414,1	+38.77	+10.41	+42,7	+11,5
2. Grasslands and sparsely vegetated areas	390,7	412.80	380.92	373,9	-14.74	-0.67	-16,8	-4,3
3. Croplands	2258,4	2212.50	2197.76	2203,6	-31.88	-7.72	-54,8	-2,4
4. Wetlands and water bodies	89,4	96.60	99.64	96,7	+3.04	+3.15	+7,3	+8,1
5. Artificial areas	218,4	236.10	233.64	236,5	-2.46	-1.04	+18,1	+8,3

6. Bare land and other areas	56,3	54.33	61.60	59,9	+7.27	+13.38	+3,6	+6,4
TOTAL	3384,6	3384.63		3384,6			-	-

Source: Talmacl, 2017

Land Productivity Dynamics (LPD)

For an assessment of land productivity trends the Joint Research Centre of the European Commission's (JRC) Land Productivity Dynamics (LPD) dataset. The LPD trends were indicated from a 15-year time series (1999 to 2013) of global NDVI observations composited in 10-day intervals at 1 km spatial resolution (UNCCD, 2016).

The LPD trends provided qualitative assessments and do not directly correspond to an absolute unit (e.g. t/ha) to measure of the biomass productivity's dynamics. The 5 classes of LPD dynamics are a qualitative and describes the persistence of specific tendencies of land ecosystem services throughout the baseline period. Therefore it is useful tool for assessing land degradation and practical LDN target setting as well as for further monitoring (UNCCD, 2016).

Classes of land productivity dynamics

Value	Description
1	Declining productivity
2	Early signs of decline
3	Stable, but stressed
4	Stable, not stressed
5	Increasing productivity

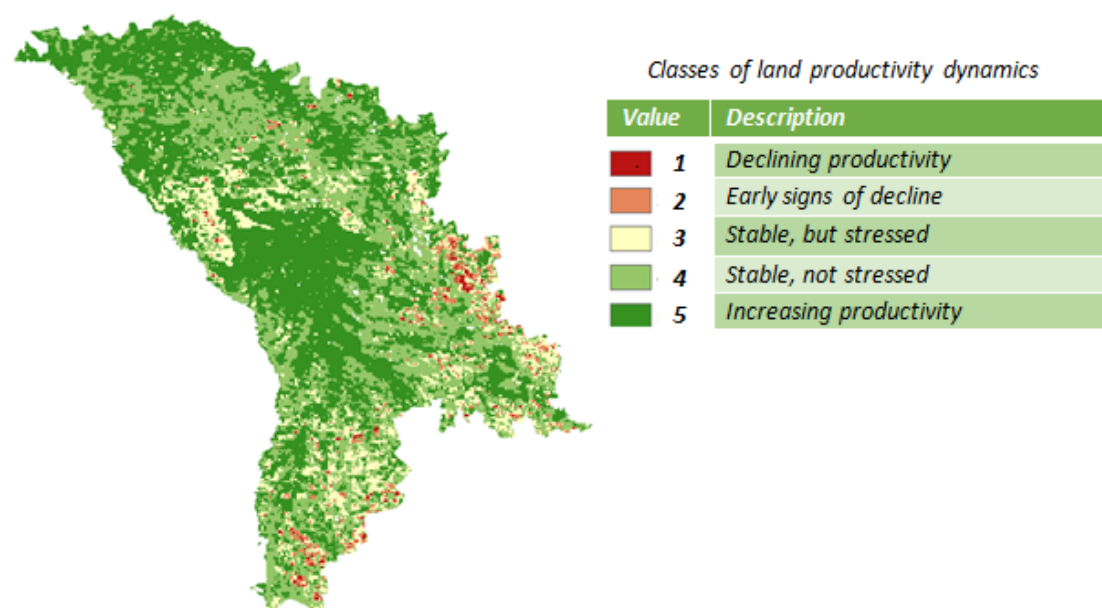Figure 5. Land Productivity Dynamics, LPD (Republic of Moldova, 1999 to 2013)
Source: The JRC's Land Productivity Dynamics

The map contains the area of each land use/cover category for Moldova and facilitate to assess the intensity of negative or positive alterations of land productivity in land use/cover categories. The Net LPD is provided for all land use/cover that remains unchanged between the periods.

Soil organic carbon (SOC) stocks

Soil organic carbon (SOC) balance represent the difference between the carbon entering the soil (humification of vegetal residues and organic fertilizers) and the carbon coming out of the soil due to organic matter mineralization process. A positive and neutral carbon balance indicates the absence of GHG emissions. A negative balance occurs

Soil carbon source and balance in agriculture lands (Republic of Moldova, 1990 - 2010)

Carbon source and balance	1990	2000	2010
Organic fertilizer, kt	4.64	4.8	1.0
Above and belowground crop residues, kt	742.0	173.6	197.0
Loss by the mineralization of humus, kt	-259.7	-916.5	-1138.3
Net Soil Carbon, kt	946.6	-738.0	-940.2
Net Soil Carbon , t/ha	0.56	-0.44	-0.60

Source: adapted from National Inventory Report, 2015

when the carbon coming out of the soil exceeds the amount of organic matter stored through humification processes and indicates loss of soil carbon and respectively reducing quality and fertility of agricultural soils. Default data on stocked SOC (ton ha^{-1}) used for 2000. To obtain the estimates on baselines and on the trends in the change of SOC stocks beyond of 2000, the methodology for compiling National Greenhouse Gas Inventories was employed.

The post-Soviet land reform in the 1990-s has cardinally increased land and soil degradation, mainly due to using unsustainable land practices and changing land ownership and tenure pattern form. It is primarily conditioned by loss Soil Organic Carbon (SOC).

For the forests, the respective profound loss changed to the positive trend in the middle of 1990-ies due to the extension of forest cover areas and applying broader reconstruction of damaged forests with low productivity (Talmachi, 2017).

Figure 6. Annual net Soil Organic Carbon trend (5-years moving average) for forest land category (Republic of Moldova, 1990 - 2013)

Grassland category was undergone less variability during the post Soviet period, whereas the Cropland category has experienced a catastrophic decrease of soil carbon stock that led to the transition from a positive carbon balance (+0.56 t/ha in 1990, before the land reform implementation), to a profoundly negative balance (-0.60 t/ha in 2010).

Soil degradation factors of agricultural lands		
Factors	Area, ha	Damage, mln. $ US
Water erosion	839,7	221,4
Secondary compaction	2183,0	39,7
Dehumification	1037,0	18,9
Drought	256,0	23,3
Ravines	8,8	7,6
Landslides	81,0	8,4
Excessive moisture	49,6	4,7
Salinisation	20,0	1,8
Iirrigation	12,8	0,7

Source: adapted from Leah, 2012

Figure 7. Net Soil Organic Carbon trend (5-years moving average) for Grassland category (Republic of Moldova, 1990 - 2013)

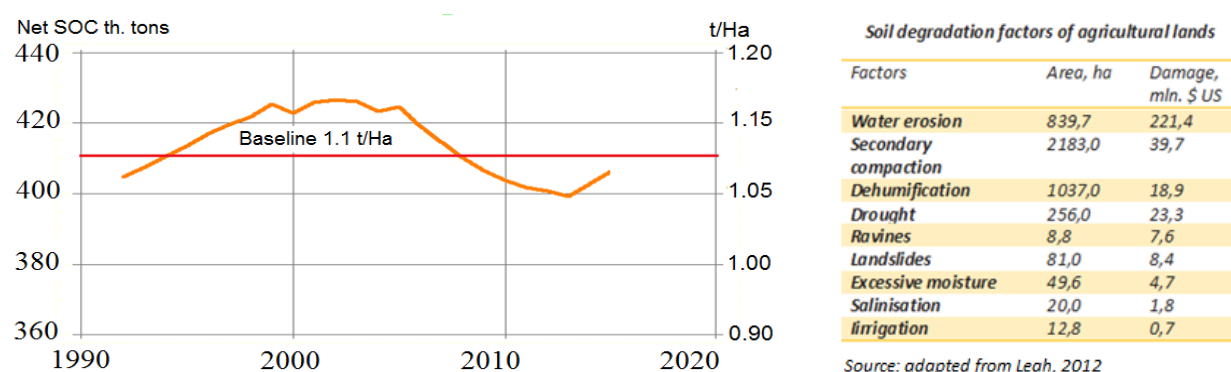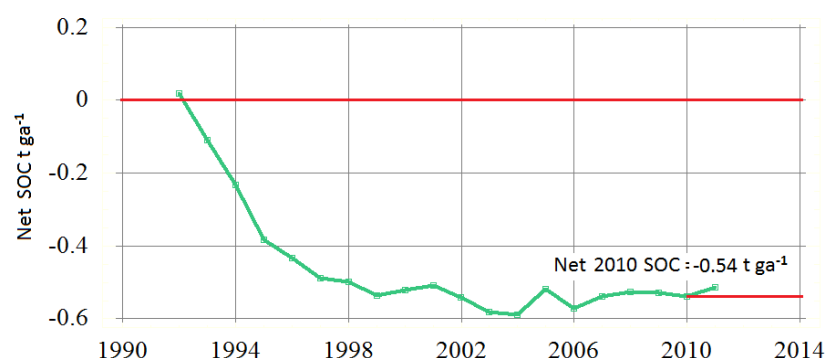*Figure 8. Net Soil Organic Carbon trend (5-years moving average) for Croplands (Republic of Moldova, 1990 - 2013)*

Synergetic effects of land/soil degradation

Land plays an important role in the carbon cycle for the terrestrial ecosystems and, therefore, has significant implications as part of the carbon inventory requirements in the context of climate change monitoring and biodiversity conservation.

Specific contribution clearly accounts for climate risks such as mitigation of the negative effects of drought and related risks, raising the quantity and improving the quality of water resources and increasing the potential and conservation of biodiversity. An examination of a soil carbon cycle fluxes in the Republic of Moldova by land cover category reveals that the cropland category is the

Land as a source and sink of CO$_2$ emissions, mln. tons

Land Category	2000	%	2013	%	Change 2000-2013,%
Forest Land	-2140.3	35.6	-1887.6	28.6	-7.0
Cropland	2304.0	38.4	3245.4	49.2	10.8
Grassland	-1557.0	26.0	-1457.2	22.1	-3.9

Taking action to hold the degradation processes for biodiversity

➢ *Afforestation and grassing of the protection strips to ensure measures of halting land degradation and climate change mitigation (corresponds to Aichi Target 12):*
2014 – 300 ha;
2015 – 360 ha;
2016 – 310 ha.
➢ *By 2020, greenhouse gas emissions from the agricultural sector will decrease by 20% (corresponds to Aichi Target 7);*
➢ *By 2018 an area of 30,000 ha of riparian protection strips of river water and aquatic basins will be afforested (corresponds to Aichi Target 15);*
➢ *By 2020 ecological reconstruction of 5,000 ha of degraded forest will be carried out (corresponds to Aichi Target 5).*

largest source and sink of emissions accounting for 1/2 (49.2% in 2013) of the total emissions in the LULUSF sector, followed by forest lands and grassland. The figure below is an illustration of synergetic effects of land/soil degradation in a changing climate which shows an alteration of the status of the agricultural lands under the carbon inventory requirements by increasing CO_2 emissions and converting the trend from sink (negative values) to source (positive values).
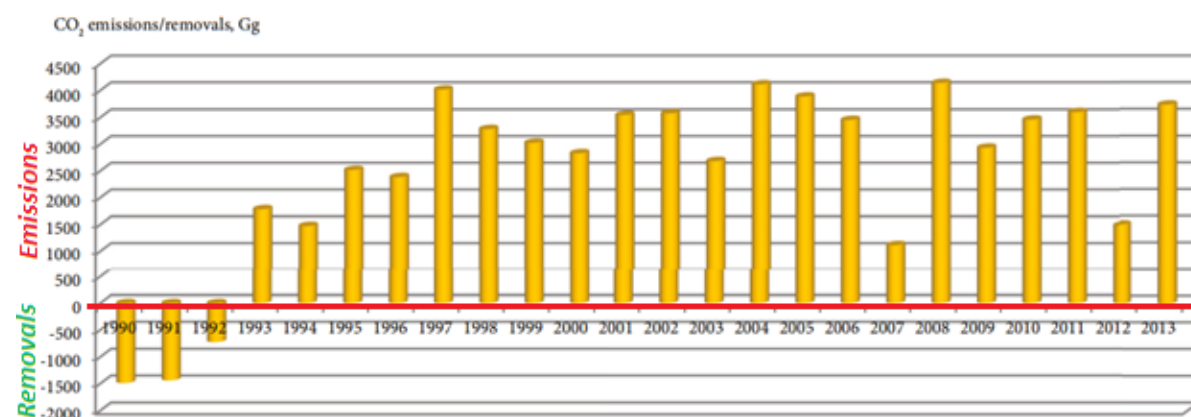

Figure 9. Changing the Croplands status under the climate change carbon inventory requirements (Republic of Moldova, 1990-2013).
Source: adapted from National Inventory Report, 2015

Driving forces

Intensive use of land resources and poor adaptability of applied agricultural practices along with ineffective risk governance have created an increased and wide-ranging impact of environmental degradation related to severe soil fertility decline and reduction in resiliency and functional integrity of the ecosystems. Land privatization and its parceling, lack of crop rotation and anti-erosion measures, non-implementation of recommendations and best practices for soil protection and conservation have complicated the possibility for efficient soil resource management. On the narrow-privatized parcels, located along the hillslopes, soil cultivation is performed in the same direction (up-and-down the hill), thus accelerating erosion.

Global challenges such as climate change are a key driver of land/soil degradation affecting all development sectors in the Republic of Moldova. Increased drought risk of recent years due to climate change suggests that the country remains highly vulnerable to this global environmental challenge. For the period from 2000 to 2015 Moldova had experienced several (2000, 2003, 2007, 2012) droughts that had a dramatic effect on Moldova, such as the ones in 2007 and 2012 when drought impact acquired the scale of a nationwide environmental and socioeconomic catastrophe. In 2007, for example, estimated losses caused by drought reached 23% of the Gross Domestic Product**.** Overall the number of people affected constituted 1.2 million; 156 villages were qualified as strongly affected Daradur et al., 2015).

Increased exposure to land/soil degradation and drought hazard, and their translating into a great risk for the Republic of Moldova, can be attributed also to poverty and high rural vulnerability. Since the proclamation of independence (1991) Moldova has gone through an

unprecedented economic transformation which, due to the rapid and often chaotic transition process, has accelerated environmental degradation and has been associated with increasing poverty and rural vulnerability. Taking into consideration the high concentration of rural population and weak economic capacity of the affected areas, improved land/soil degradation risk assessment and management are critical for supporting sustainable development and poverty reduction in the Republic of Moldova.

3. SETTING LAND DEGRADATION NEUTRALITY TARGETS

Land sector targets setting approach

Degraded lands are defined as a permanently lost its agricultural productive capacity through erosion, pollution or destructive anthropogenic activity, but can be improved through afforestation and other measures that restore its ecosystem services (Law on Improvement of Degraded Land through Afforestation of the Republic of Moldova, 2000). In specific conditions of the Republic of Moldova the term of degraded land related to lands with strong and excessive surface and deep erosion, land affected by salinity, sandy soils affected by wind and water erosion and to polluted land. We selected specific targets under SDGs 6, 13 and 15 that are closely related to sustainable land use and management, including water resource, emissions abatement and biodiversity and land degradation and identified targets based on following criteria:
- ➢ Relevance to the SDGs;
- ➢ High priority for Moldavian land-sector;
- ➢ Clear policy implications; and
- ➢ Science credibility.

In specifying national LDN target and indicators, we adapted existing national and international targets to ensure consistency with SDGs and other global or national targets, and to capitalize on previous target-setting efforts.

LDN voluntary target of Moldova was established as follows:

"Improving land/soil conservation and ecological restoration of degraded lands to achieve by 2030 no net loss of productive land/soils and increase drought resiliency, adaptation capacity and biodiversity services of agricultural ecosystems". The target was endorsed and transparently communicated at the national and international level. The national LDN agenda integrates global obligations and ensures a high relevance and clear policy implications to government land-sector priorities, capitalizing the previous country land sector target-setting efforts. Land degradation has synergetic effects and significant implications related to climate change as part of the carbon inventory requirements and biodiversity services conservation.

Impacts and ambitions level assessment

One objective of land degradation neutrality target is to assess current land resource use and planning that allow establishing suitable baselines for monitoring progress, evaluating trade-offs and prioritizing action at the appropriate scale. When the national LDN task targeted and indicators identified, the issue was addressed of what indicator levels are required to attain this target and what are the specific targets. An investigation is needed to obtain quantified assessments on impacts of the main land sector interventions to achieve LDN within the

established time period of 2030. Such examination provides an informed evidence base for setting sound LDN ambitions and prioritizing efforts in areas where degradation is taking place.

Impact assessments were based on effects of Government planning efforts and anticipated interventions to boost land sector sustainability. To obtain the predicted estimates of SOC stocking and assess the policy targeted effects on national land sector sustainability we make use of predicted CO_2 emissions estimates under different scenarios (National Inventory Report, 1990-2013).

Table 2. CO₂ removals and emissions (th. tones) for the LULUCF sector were used for predicted SOC stocks

	1990	2010	2015	2020	2025	2030
LULUCF	*-5,889.9*	*37.8*	*-230.24*	*-1,088.44*	*-3,177.2*	*-4,491.04*
Forest land	*-2,197.6*	*-2,193.3*	*-2,168.35*	*-2,426.19*	*-2,679.1*	*-2,931.61*
Cropland	*-2,216.0*	*2,987.7*	*2,705.58*	*2,105.22*	*269.37*	*-791.96*
Grassland	*-1,476.2*	*-756.6*	*-767.5*	*-767.5*	*-767.5*	*-767.5*

Source: First Biennial Update Report of the Republic of Moldova, 2016

The predicted scenario considers the effects of planning activities implemented or adopted since 2010 and includes: the measures on land/soil conservation and improvement of soil fertility; an introduction of conservation agriculture; as well as measures and Government efforts contemplated by Development Strategies of the Republic of Moldova until 2030. These estimates are used for monitoring progress and assessing the impacts of undertaken planning actions on the land sector sustainability to achieve national LDN agenda.

The table 3 and figures below illustrate the summary of the LDN indicators baselines and current trends (described with 5-year moving average/or polynomial functions) with predicted values of annual net of soil carbon change for the period 1990-2030.

Table 3. The summary of the LDN indicators baselines, thousand ha (Republic of Moldova)

Land Use/Cover Category	Area, th. ha 2000	Area, th. ha 2010	Declining	Early signs of decline	Stable but stressed	Stable not stressed	Increasing	SOC 2010 ton ha^{-1}
1. Forest	372.30	411.07	0	0.55	3.30	18.17	346.42	108.7
2. Grasslands and sparsely vegetated areas	412.80	380.92	0	1.58	6.33	20.56	378.00	104.5
3. Croplands	2212.50	2197.76	21.08	66.50	318.70	826.42	970.90	94.2
4. Wetlands and water bodies	96.60	99.64	0.32	0.32	4.49	35.94	28.24	110.3
5. Artifical areas	236.10	233.64	1.07	1.67	10.37	138.73	81.16	82.9
6. Bare land and other areas	54.33	61.60	0	0	0	0	0	74.8
SOC average (ton/ha)								95.9
% of total land			0,7%	2,1%	10,1%	30,7%	53,3%	

area								
Total (th. ha)	3384.63	3384.63	22.47	70.62	343.19	1039.82	1804.72	

In the LDN conceptual framework, the minimum target equals the baseline because the goal of the LDN is to achieve no net loss of soil carbon. Using another wording, the minimum goal is to stabilize the negative trend on net SOC and achieve an equilibrium of the soil carbon dynamics relatively of baseline values. The dataset on CO_2 removals and emissions, calculated by using a methodology for compiling National Greenhouse Gas Inventories to estimate the SOC values. The estimates of the SOC values beyond 2013 were based on annual net CO_2 projections using an impact assessment of target-setting efforts and planned LDN related interventions to reduce and restore of degraded lands/soils starting from 2010, as well as land use/cover change trends under policy planning documents.

The figure 10 illustrates an assessment for the SOC indicator, used to monitor projected (post 2010) progress in achieving LDN in the LULUCF sector of the Republic of Moldova. The LDN baseline is the initial value of the SOC indicator used to monitor progress in achieving LDN. The baseline values of the indicator were averaged over the period leading up to implementation of the LDN conceptual framework (t_0=2010) and re-assessed at t_1=2030 with 5-year moving average based on predicted SOC.
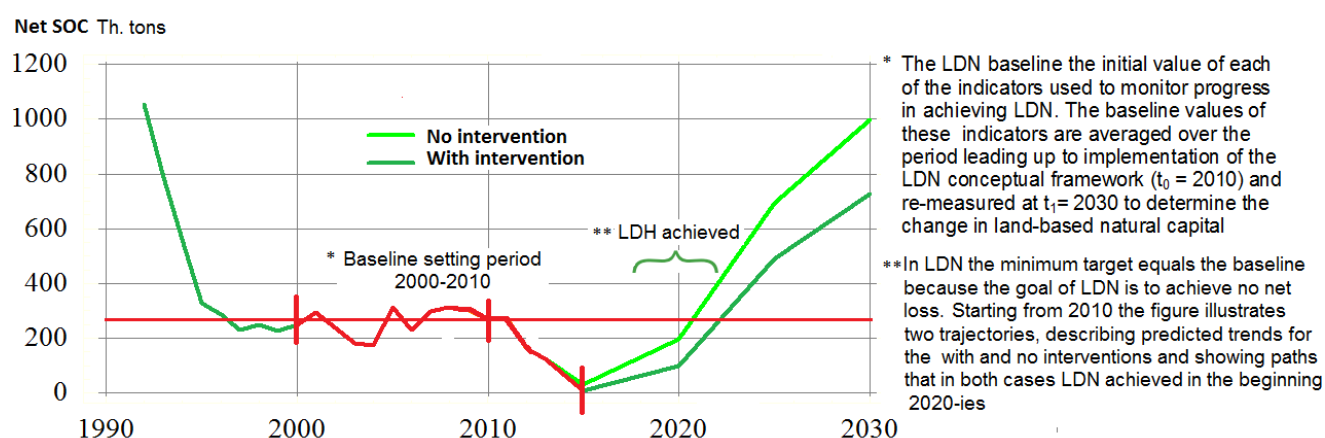

Figure 10. Predicted net Soil Organic Carbon stocks trends with and no intervention, LULUCF sector (Smoothed with 5-year moving average)

Starting from 2010 the figure above illustrates the trajectories with and no intervention, describing predicted trends and showing that in both cases, the positive trends have reached the baselines. It means that, for example, in LULUCF sector, minimum LDN will be achieved in the beginning of 2020-ies.

For the grassland category (figure 11) the assessments show that the planned action will have temporal effect and stabilize the negative trend SOC balance in recent years and immediate perspective. Beyond 2020-ies, grassland degradation will strength and the planned activities would not be sufficient to prevent SOC loss. Additional measures would be required to promote SOC stocking and to achieve the LDN minimum target for this indicator.
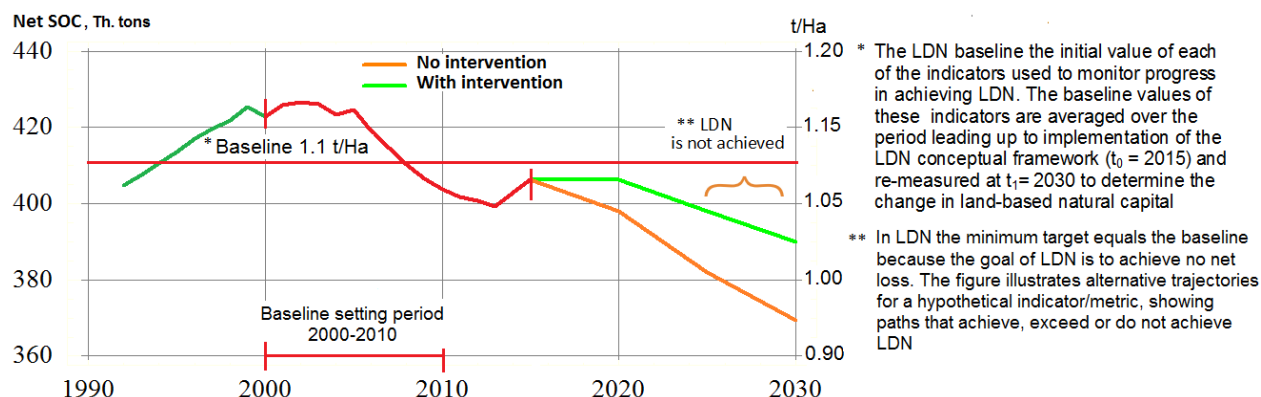
Figure 11. Predicted net Soil Organic Carbon stocks trends with and no intervention, Grasslands (Smoothed with 5-year moving average)

The estimates show that after a profound soil degradation and loss of SOC during the 1990-ies, in the forests and, especially, in the croplands, some positive effects of recently undertaken measures have led to an increase of SOC stocking. Since the SOC loss was so profound and the current positive changes have acquired a sustained character, the minimum LDN targets (the values averaged for a period of 10 years prior to t_0=2010) for these land categories have been already reached at current time.

According to the estimates, for the Croplands, by the 2030, Moldova can reach positive balance of the annual SOC stocking which can be converted from negative to positive values (figure 12). By that, the status of the Agricultural lands under the CO_2 inventory requirements can be changed again to sink (no emissions) as in the beginning of 1990-ies (before of post-soviet land reform).
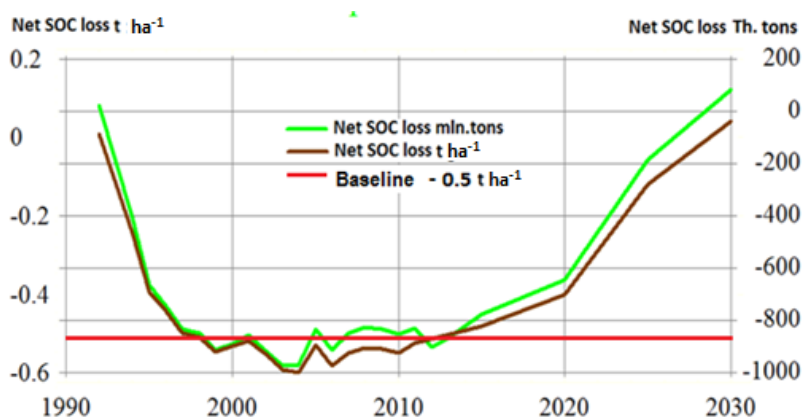
Figure 12. Predicted net Soil Organic Carbon trends for Croplands (Smoothed with 5-year moving average)

For forests (figure 13) the ongoing SOC trends show an increase of divergence between the SOC values of the total net SOC (calculated for all forest area) and the SOC balance estimated for the area unit (ha^{-1}). The trend of the latter shows the less rate of increase in time

that means the positive effects are reached by forests area extension rather than by overall improving quality of existing forest lands. It is an important particularity of the positive changes which point out the extensive base of ongoing alterations and extensive techniques undertaken policy interventions.

Figure 13. Predicted net Soil Organic Carbon trends for Forests (Smoothed with polynomial)

4. ACHIEVING LAND DEGRADATION NEUTRALITY

Main directions of intervention
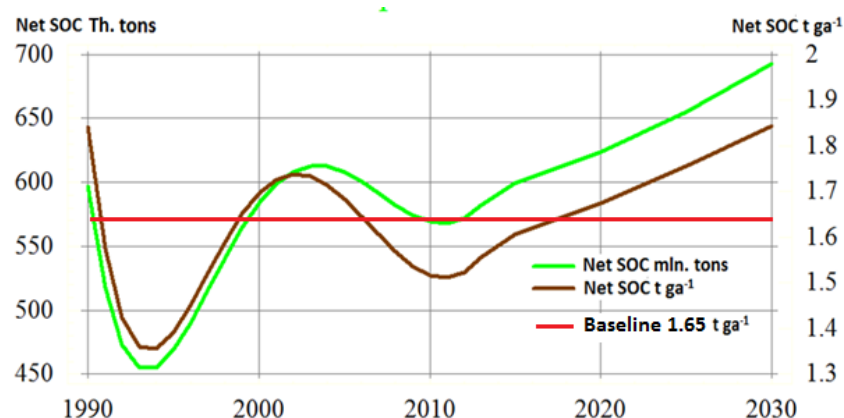
Restoration of degraded and affected by landslides lands *can be achieved* through the development of a program of complementary and compensatory measures of cleaning, recovery and/or ecological restoration of degraded soils, in order to bring them as close as possible to their natural state, through eliminating any significant risk of impact on them. The main cause of erosion and landslides is the lack of vegetation that ensures land and soil stability. Therefore, the least productive and eroded lands will be excluded from the arable land fund and transferred to a special "recovery" fund for ecological restoration. **As a result, condition and quality of 880,000 ha of degraded land and 21,570 ha of landslides area will be improved.**

Complementing the greenbelt plans for land and soil conservation. Greenbelts fulfill sanitary and hygienic functions, functions of soil protection, territorial hydrological regime regulation, water protection, etc. To improve the ecological condition of land fund, it is necessary to create greenbelt carcass to protect farmlands and natural areas. The necessity of **farmland buffer strips planting is 3.5% from the total area of agricultural lands.** The current area of buffer strips is 30,800 ha, of which 3,000 ha were destroyed in the past ten years. So, based on these numbers, works of planting, **regeneration and ecological reconstruction have to create about 28-30,000 ha of farmland buffer strips and rehabilitate 3,000 ha that were destroyed.**

Remediation of land contaminated by persistent organic pollutants and other hazardous chemical substances. Consolidation of efforts to attract the investment necessary to continue the work on identification of contaminated lands, effectuation of remediation measures at contaminated sites, detected in the process of inventory, with their reintroduction into economic circuit, and prevention of new accumulations of pesticides, other hazardous substances and chemicals, and of their spread across the country.

Baseline status, main measures and synergetic benefits of LDN related interventions

Table 4. Baseline status, main measures and synergetic benefits of LDN related interventions

Baseline Status	LDN related main intervention	Sub-targets	Synergetic benefits
Land/ soil are permanently subject to intensive degradation processes caused both by natural and anthropogenic factors.	*Integration LDN principles into Land use/planning;* *Improving soil quality and ecological restoration of degraded land by extension of forest areas and natural areas protected by state and ensuring sustainable land management and natural ecosystems protection;* *Improving soil quality by rehabilitation damaged and planting new farmland buffer strips to obtain their science-based density*		*Contributing to reducing emissions, water security, biodiversity protection, and climate change mitigation and adaptation.* *Biodiversity and ecosystem services conservation;* *Greenbelts established*

	for effective soil protection; Consolidation of efforts to attract the investment necessary to remediation of contaminated sites, their reintroduction into economic circuit, and prevention of new accumulations of pesticides, other hazardous substances and chemicals;		to link mosaic forest areas for survival condition (providing shelter, food, migration ability) for threatened species
953,900 ha (42%) of all agricultural lands under degradation **21,570 ha of land subject to active landslides**	Exclusion degraded from arable land fund and transferred to a special "recovery" fund to be subject to ecological restoration.	Avoided soil erosion and compaction; restored and well-maintained vegetation cover of 880,000 ha 21,570 ha under active landslides;	Carbon pool of the area maintained, and carbon sequestration capacity increased;
Current forest areas 13.7% is much below the European average (30%). The forest fund is highly fragmented, forest areas, are dispersed and isolated.	Further increase in forest cover through forestation and improved forests management, interconnecting forest greenbelts for maintaining biological diversity, conserving soils and providing hydrologic protection.	Expansion of forest areas to 15% by planting 150,000 ha of forest; 30,000 ha of riparian and water basins protection strips will be planted	Increased forest area by 150,000 ha, mainly in degraded lands; Contributing to water security, biodiversity protection, and climate change mitigation and adaptation; Carbon sequestration potential **of about 9.56 MtCO2 e** Carbon sequestration potential **of about 1.91 MtCO2 e**
The current area of buffer strips is 30,800 ha; 3,000 ha are destroyed;	Complementing Moldova's greenbelts plans that protect valuable farmland areas. To improve the ecological condition of the land fund, it is necessary to create forest (green) carcasses for agricultural land protection	Greenbelt planting up 3,5%, (79,000 ha) of overall are of croplands; 3,000 ha rehabilitated;	Carbon sequestration potential **of about 5.04 MtCO$_2$ e**
1,588 contaminated sites	Consolidation of efforts to attract the	Remediation	

were identified; contaminated with persistent organic pollutants	*investment necessary to remediate contaminated sites, their reintroduction into economic circuit, and prevention of new accumulations of pesticides, other hazardous substances and chemicals, and of their spread across the country.*	*measures at those 1,588 contaminated sites*	

Institutional arrangements for managing, implementing and monitoring of LDN

Ministry of Agriculture, Rural Development and Environment (MARDE), former, Ministry of Environment (ME) of the Republic of Moldova is the central public authority responsible for the development of legal and regulatory framework in the field of environmental protection and land policy formulation, rational use of natural resources and biodiversity conservation. Representatives of the **MARDE** perform the function of the UNCCD Focal Point. On behalf of the Government of the Republic of Moldova, the **MARDE** is responsible for the implementation of Land-Degradation-Neutrality (LDN) program and will oversee the LDN target setting process.

The Policies, Strategic Planning and Foreign Aid Division of the State Chancellery functions consist in policy coordination and strategic planning, setting the framework for defining development priorities of the Government, including the Foreign Assistance, analyzing and ensuring consistency with the strategic priorities of the country, coherent and well coordinated with all relevant policy documents and normative acts for Government decisions. The institution coordinates nationalization of SDG target setting process in the country.

The Division for Policy Evaluation, Monitoring and Assessment Ministry of Environment ensures and coordinates development, monitoring, evaluation and reporting on the implementation of policy documents on environmental protection and sustainable use of natural resources.

The Division on Natural Resources and Biodiversity within the MARDE, develops and promotes State policy on conservation and sustainable use of natural resources. It develops the legislation on land resources and implements programs and plans on protection and conservation of natural heritage. It coordinates the activities connected with biological diversity conservation and protected areas management and develops related legislation.

The Agency for Land Relations and Cadastre (ALRC) is coordinating state activities related to surveying, mapping, Cadastre and GIS. ALRC is also responsible for the establishment and maintenance of the national geospatial data infrastructure in the country (www.geoportal.md).

The State Ecological Inspectorate is responsible for the enforcement of environmental policies and laws, including those related to land protection. It is in charge of issuing licenses, land and forest inspecting and making sure that afforestation programs are implemented.

The State Forestry Agency "Moldsilva" is responsible for implementing the state policy on forestry, as well as cooperating with the ME on the implementation of the UN Convention to Combat Desertification and the UN Convention on Biological Diversity.

The Institute for Forestry Research and Planning is under Moldsilva's authority. It is responsible for the development of forestry management plans for forest companies. It is also responsible for statistics on forests and forestry.

The Ministry of Agriculture and Food Industry (MAFI) cooperates with the MARDE on the UNCCD implementation of the state policy on land protection. Socioeconomic indicators that are used to evaluate drought and associated risks are also under responsibility of the MAFI. Data is sent in from the districts to the Department of Crops of the MAFI for compilation and analysis. The MAFI also promotes crop insurance against drought and other natural hazards, matching compensation by the insurance companies.

Institute of Pedology, Agro-chemistry and Soil Protection is the primary resource for soil information and research on genesis, physical, chemical, biological and geographical particularities of soils, aims studying and creating the informational database to contribute implementing advanced technologies in agriculture, developing concepts, strategies and programs in soil science and agro-chemistry and promoting efficient practices to combat land degradation, land recovery and soil protection.

The Research and Project Center "Eco-Logistica" provides support to the governmental institutions and scientific society of the Republic of Moldova, central and local public authorities, private actors in research and project development activities on land sector sustainability in a changing climate. The overall goal of the Center is to promote new services and develop decision support tools to transform sophisticated scientific information for an effective decision making and reducing a missing link between climate, land sector data and its utilization by the end users.

Local Public Authorities. Land use in Moldova is to a large degree a private sector activity and the decisions on land management are often a prerogative of the private actors at the local level. So, wide involvement of the local Public Authorities and agricultural producers is, therefore, highly critical for the identification degraded lands and hot spots areas and effective for implementing LDN program.

LDN related projects and programs

Table 6. LDN relevant projects being developed in the Republic of Moldova

No.	Project	Objectives	Responsible organization	Costs
1.	*Climate Resilience through Conservation Agriculture (Inclusive Rural Economic and Climate Resilience Program – IRECR) 2014-2020*	*To increase the income and climate resilience of the rural poor, enhance adaptive capacity of rural farmers through sustainable land approaches*	*Ministry of Agriculture and Food Industry, Agricultural Institutions and Organizations*	*US$ 4.37 million*

2	**Project: Moldova Community Forestry** *2009-2018*	*To restore degraded land through forestation to increase economic and environmental benefit to rural communities*	*State Forestry Agency "Moldsilva"*	*US$ 10.00 million*
5.	**Moldova Soil Conservation** *2012-2022*	*Restoring productivity of degraded land, enhancing forest product supplies to local communities, and promoting net GHG removals by sinks across a total area of 20,300 ha spread throughout the country.*	*State Forestry Agency "Moldsilva"*	*US$ 34,378.2.*

Financing opportunities

An examination of funding opportunities and development agencies, including donor thematic areas that have been carried out, identifies funding opportunities for LDN for the Republic of Moldova.

The budget process still lacks clear environmental priorities, indicating a very weak orientation of environmental planning and allocation of budgetary resources to environment protection is modest. Besides, there were no State Budget allocations that would be directed exclusively to the implementation of UNCCD and other Rio Conventions. The role of the extra budget funds (revenues from using the economic tools) to prevent environmental degradation in Moldova remains low.

Lack of financial resources is a major constraint to effective LDN implementation. A number of strategies, programs and projects that support land protection and restoration of degraded lands to improve biodiversity services in a changing climate have been approved recently. However limited internal financial resources place the Government in a vulnerable state, make it dependent on foreign donor priorities. The country's environmental requirements are frequently seen as a liability rather than an asset for improving social well-being that is a continued barrier to enhance for the LDN implementation.

Existing regulatory framework in the Republic of Moldova used for environmental policy implementation does not contribute to the use of natural resources in a sustainable manner. Market-based instruments represent one of the major concerns for LDN implementation in Moldova. They are still ineffective with low incentives to improve resource efficiency or pursue green investments.

The environmental initiatives, including land sector sustainability, are mainly supported by external donor agencies. An integrated database of the external assistance on direct budget support and projects is managed by the Aid Coordination Unit of the State Chancellery. Total official development assistance (ODA) to the Republic of Moldova, on average, constitutes to some 6% of GDP. Among the major potential donors in Moldova are EU, IMF, EBRD, UNDP, UNEP and governments of developed countries such as Austria, Germany, Japan, Romania, Sweden, Czech Republic, etc.

Currently in Moldova, 34 external donors are active in various sectors of development. Given their large number, ensuring the effective coordination of donors remains a continuing challenge for the Republic of Moldova. The challenge for the government is to ensure the effective ownership of its various national, sectoral and regional development strategies, to effectively align foreign aid with them and avoid addiction to foreign aid.

Encouraging the private sector could have a crucial contribution to all development issues, including poverty reduction and environmental protection. In the recent years, the Moldovan authorities have pursued an ambitious reform program aimed at achieving sustainable growth led by the private sector. The Government has been promoting **public-private partnerships (PPPs)** and use of **remittance funds towards small businesses (PARE "1+1", the Program on Attracting Remittances into the Economy)**. The role of these private sources, however, is still quite small but could grow, depending on the extent to which the investments allow for full cost recovery on a sustainable basis.

CONCLUSIONS AND RECOMMENDATIONS

Land degradation is a great challenge for all sectors of development in the Republic of Moldova. It has created increased and wide-ranging environmental and development impacts related to a reduction in resilience and functional integrity of the agro-ecosystems and severe decline of soil fertility. The post-Soviet land reform in the 1990-s has cardinally increased land degradation, mainly due to using unsustainable land practices and changing land ownership and tenure system.

The LDN target setting process and related awareness and communication activities facilitated expert debates about the possible solutions to the main constraints related to the implementation of the LDN conceptual framework in the Republic of Moldova. Governmental leadership and stakeholders' engagement was recognized as challenging in LDN promotion and mainstreaming into national policies. Establishing a multi-stakeholders platform and securing high level representation of the National LDN Working Group (LDN WG) created a formal collaborative and synergetic framework for monitoring and evaluation of LDN implementation. However, collaboration at the institutional level (both national and local) remains poor. None of the institutions involved in or responsible for LDN information exchange are using a networked based database for storing and exchanging data.

Moldova's national land inventory approach do not correspond to the international reporting requirements on LDN. The land/soil monitoring and management system should be based on a remote sensed approach to promote extended and new services in improving accessibility of the land management design information for decision making. Guidance is required in order to improve accessibility and increase awareness on the partnerships with the key stakeholders in developing new land sector related design products based on real-time information and services.

The Program has established an inconsistency of remotely sensed default and national land cover data due to insufficient resolution of the global approach. The most striking feature of the long-term land cover/use change is a decrease of natural ecosystems with transformation to agricultural lands. This modification of natural lands has resulted in a great mosaic of land cover patterns with a changing the structure and functionality of ecosystems which do not capture by default data. Moldova's predominant land cover remains overwhelmingly agricultural, while farming is the dominant land use activity.

In the absence of national data on Land Productivity Dynamics (LPD) the remote sensed default datasets are considered a suitable source to obtain an indication of default baselines on this indicator. To obtain the change of SOC stocking beyond baseline year (2000), a methodology for compiling National Greenhouse Gas Inventories is employed to examine net SOC trends.

Land and soil degradation is primarily conditioned by loss Soil Organic Carbon (SOC), mainly due to using unsustainable land practices and changing land ownership and tenure system. While in forests the respective decreasing SOC was stabilized and even converted to positive dynamics, Cropland category has experienced a catastrophic loss in soil carbon that led to the transition from a positive carbon balance (+0.56 t/ha in 1990, before the land reform initiation), to a profoundly negative balance (-0.60 t/ha in 2010).

The overall voluntary LDN target of Moldova is: **"Improving land/soil conservation and ecological restoration of degraded lands and farmland greenbelts to achieve by 2030 no net loss of productive land/soils and increase drought resiliency, adaptation capacity and biodiversity services of agricultural ecosystems"** was endorsed and transparently communicated at the national and international level. National LDN agenda integrates global obligations and ensures a high relevance and clear policy implications to government land-sector priorities, capitalizing the previous country land sector target-setting efforts. Land degradation has an synergetic effects and significant implications in regional climate change as part of the carbon inventory requirements and biodiversity services conservation.

An important particularity of observed and predicted dynamics of the net SOC are extensive techniques of the undertaken policy interventions leading to positive alteration of SOC trends. For example, in the forests, the SOC trends show an increase of divergence between the SOC values of the total net SOC (calculated for all forest area) and the SOC balance estimated for the area unit (ton ha^{-1}) that means the positive effects are reached mainly by forests area extension rather than by overall improving quality of existing forest lands.

Additional measures would be required to promote SOC stocking to reach the LDN minimum target in the grasslands. The effects of planned activities for the grassland category will have temporal effect and stabilize the negative dynamics of SOC balance in recent years and immediate perspective. To prevent SOC loss beyond 2020, the planned activities would be insufficient to stabilize the negative trend of this indicator and achieve an equilibrium of the soil carbon dynamics relatively of baseline values.

Lack of financial resources is major constraints to the effective LDN approach implementation. The country's environmental requirements are frequently seen as a liability rather than an asset for improving social well-being. The lack of political clout of the environmental authorities is going to be a continued barrier to enhance for the LDN conceptual framework implementation. A number of strategies, programs and projects that support land protection and restoration of degraded lands to improve biodiversity services in a changing climate have been approved recently. However limited internal financial resources place the Government in a vulnerable state, make it dependent on foreign donor priorities. For the effective implementation LDN conceptual framework the planning efforts should be properly integrated into the budgetary process.

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National Land Degradation Neutrality Targets

ANNEXES

Annex 1. The list of National LDN Working Groups

Name of organization	Website	Name of representative	email
State Hydrometeorological Service	www.meteo.md	**Mihail Roibu,** *Director, National Focal Point*	mihail.roibu@meteo.gov.md
State Hydrometeorological Service	www.meteo.md	**Valeiu Cazac**, *Department Director, Deputy Focal Point.*	valeriu.cazac@meteo.gov.md
Research and Project Center Eco Logistica	www.eco-logistica.org	**Mihail Daradur**, *Project manager, LDN national consultant*	m.i.daradur@gmail.com
Ministry of Environment	www.mediu.gov.md	**Veronica Lopotenco**, *Department of Environmental Policy, Monitoring and Strategic Planning*	lopotenco@mediu.gov.md
Ministry of Environment	www.mediu.gov.md	**Veronica Josu,** *Şef-adjunct direcţie*	josu@mediu.gov.md
Ministry of Agriculture	www.maia.gov.md	**Mihai Suvac,** *Department Director*	mihai.suvac@maia.gov.md
Ministry of Agriculture	www.maia.gov.md	**Marina Ciobanu,** *Department Interim Director*	marina.ciobanu@maia.gov.md
Agenţia Relaţii Funciare şi Cadastru a Republicii Moldova	www.arfc.gov.md/	**Viorel Lupu-Gorita,** *Department Vice Director*	info@arfc.gov.md
Agenţia Relaţii Funciare şi Cadastru a Republicii Moldova	www.arfc.gov.md/	**Vladimir Rotaru,** *Director of Soil Protection and Land Improvement State Agency*	info@arfc.gov.md
Academy of Science, Institute of Ecology and Geography	www.ieg.asm.md	**Overcenco Aureliu,** *Scientific Researcher*	overcenco@gmail.com
Institute of Pedology, Agro-chemistry and Soil protection "N.Dimo"	www.ipaps.md	**Moșoi Iurie** *Director*	ipaps_dimo@mtc.md
Institute of Pedology, Agro-chemistry and Soil protection "N.Dimo"	www.ipaps.md	**Leah Tamara** *Vice-director*	tamaraleah09@gmail.com

State Agency "Moldsilva"	*www.moldsilva.gov.md*	*Valeriu Caisîn, Vice director*	*msilva@moldsilva.gov.md*
State Agency "Moldova Waters"	*www.apelemoldovei.gov.md*	*Marian Lidia, Primary Specialist, Direction of Water Resources Management*	*liadiamarian@gmail.com*
State Agrarian University of Molova	*www.uasm.md*	*Andreuca Valentina Sefa Catedrei de Agroecologie si Stinta a Solului*	*valandriuca@yahoo.com*
National Farmers Federation Moldova (FNFM)	*www.fnfm.md*	*Vasile Mirzenco Director Executiv FNFM*	*fnfmoldova@gmail.com*
State Institute of Practical Science Phytotechny	*www.agriculture.cia.md*	*Boris Boincean, PhD Scientific Researcher*	*bboincean@gmail.com*
Research and Project Center Eco Logistica	*www.eco-logistica.org*	*Natalia Ciobanu Irrigation systems specialist*	*nciobanu25@gmail.com*
Research and Project Center Eco Logistica	*www.eco-logistica.org*	*Victor Negru, IWRM Expert*	*ecologistica.org@gmail.com*
NGO "EcoContact"	*www.eco.vox.md*	*Natalia Guranda, Environment Consultant*	*n.guranda@vox.md*
Cooperative Farm "POBEDA"	*www.copceac.md*	*Nikolai Dragan, President*	*pobedacopceac@gmail.com*

Annex 2. First workshop

First workshop (Chisinau, September 30, 2016).
Theme: Land degradation Neutrality Target Setting program in the Republic of Moldova.

The overall goal of the workshop was launching the operational study of the LDN TSP with mobilizing the high level of governmental representatives and multi-stakeholder engagement to create collaborative and synergetic framework for monitoring and evaluation of the LDN TSP implementation in the Republic of Moldova and to establish a LDN Working Group.. **The main objectives** of the workshop consisted in:

➢ Enabling workshop participants to be familiar with the LDN target setting approach and to understand the key building blocks to defining national voluntary LDN targets;
➢ Establishing the National LDN Working Group for steering LDN TS process and promoting LDN mainstreaming into national policies and plans;
➢ Identifying the activities (drafted in a National LDN Target Setting Leverage Plan) for leveraging LDN target setting process;

> ➤ Discussing and approving the LDN target setting roadmap, expected outputs and detailed country specific work plan.

Inception Workshop on the LDN Target Setting program in the Republic of Moldova , September 30, 2016 (Chair: Mihail Roibu, Focal Point to the UNCCD, director of the State Hydrometeorological Service)

Source: State Hydrometeorological Service

The national LDN Working Group (First meeting, Chisinau, September 30)
Source: State Hydrometeorological Service

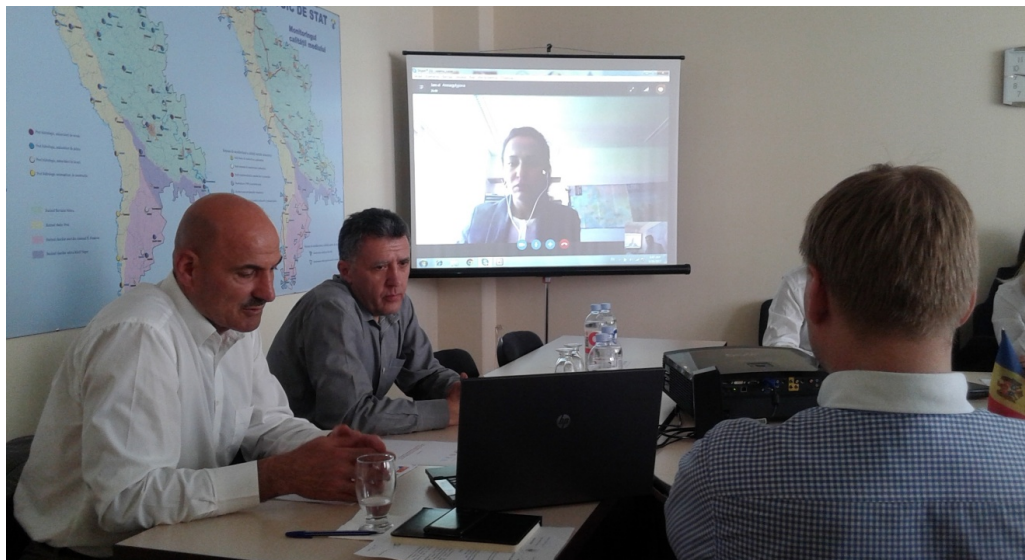*Annex 3. Second workshop (Chisinau, September 30, 2016).*

Theme: Understanding the current land degradation status and impacts for providing an informed evidence base and mapping LDN target baselines. The overall goal of the second workshop - to understand the current land degradation status and impacts in the Republic of Moldova to provide an informed evidence base for setting sound LDN target baselines. **The main objectives of the workshop consist in:**

> ➢ Assessing of the main land degradation trends and driving forces;
> ➢ LDN baselines verification and validation;
> ➢ Upgrading existing tools in land use change and impacts assessments at national level;
> ➢ Assessing LDN policy implications and nationally SDGs land sector target setting approach

Second Workshop on the LDN Target Setting program in the Republic of Moldova , May 26,2017 (Chair: Mihail Roibu, Focal Point to the UNCCD, director of the State Hydrometeorological Service; moderator Valeriu Cazac, Vice-Focal Point to the UNCCD).

Source: State Hydrometeorological Service

Second Workshop on the LDN Target Setting program in the Republic of Moldova , May 26,2017 (On-line message of Dr. Jamal Annagylyjova, UNCCD Program Officer). Source: State Hydrometeorological Service

Annex 4. Third workshop (Chisinau, November 30, 2017).

Theme: Land Degradation Neutrality targets and measures and strengthening the integration of LDN targets into the SDGs implementation in Moldova. The overall goal of the workshop was to develop a planning process for the LDN implementation stage, identifying potential LDN investment opportunities and strengthening the integration of LDN targets into the SDGs implementation in Moldova. **The main objectives of the workshop consisted in:**

- ➢ announcing LDN targets and measures;
- ➢ assessing national voluntary LDN targets implementation perspective;
- ➢ outline planning process for LDN implementation stage and strengthening the integration of LDN targets into the SDGs;
- ➢ facilitating dialogue platform and articulating, as appropriate, transformative LDN projects, potential LDN investment opportunities and financing mechanisms.