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WORKSHOP

**Forest Landscape Restoration in the Republic of
Moldova – Feasibility study on the production of
forest reproductive material**

Chisinau

12.10.2023

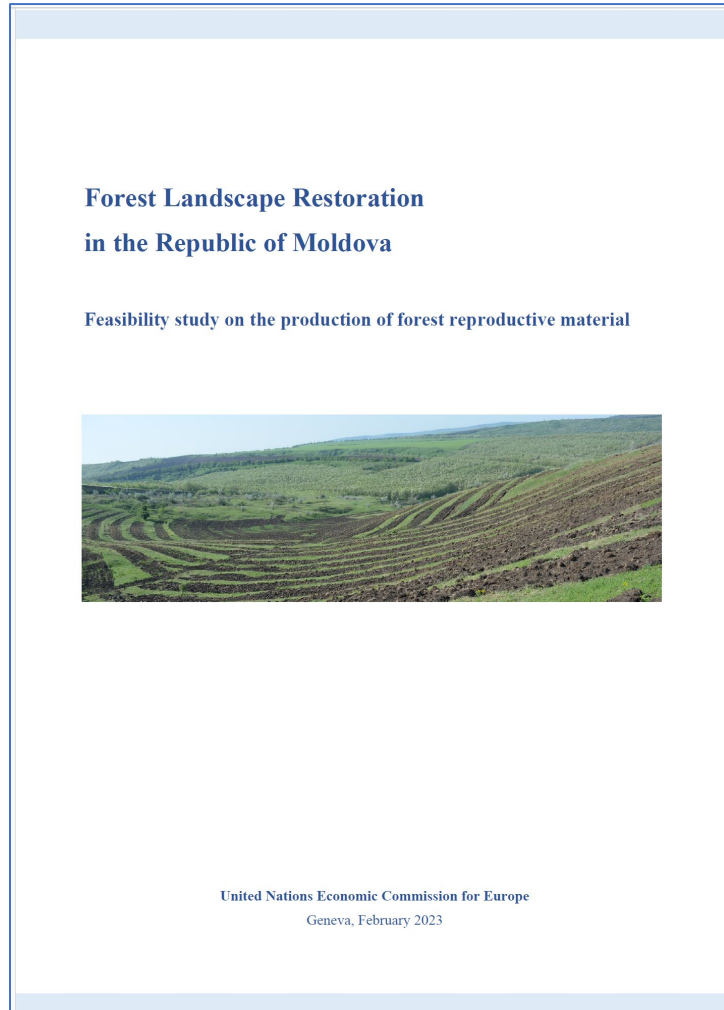


1. Context, scope, data and information for the Study

Liviu Nichiforel, UNECE, International Consultant



The Study



- **developed by the United Nations Economic Commission for Europe (UNECE)**
- **support for the modernization of the network of forest nurseries**
- **desk review and inputs of national experts from the Republic of Moldova**



Objectives of the study

- **urgent need to improve technical capacities to produce forest reproductive material (FRM) in the country**
- **analyse the approaches to reforestation, afforestation and forest landscape restoration in Moldova**
- **assessment of the current production capacity of FRM**
- **perspectives for FRM development within the context of the national plans for afforestation and forest landscape restoration**



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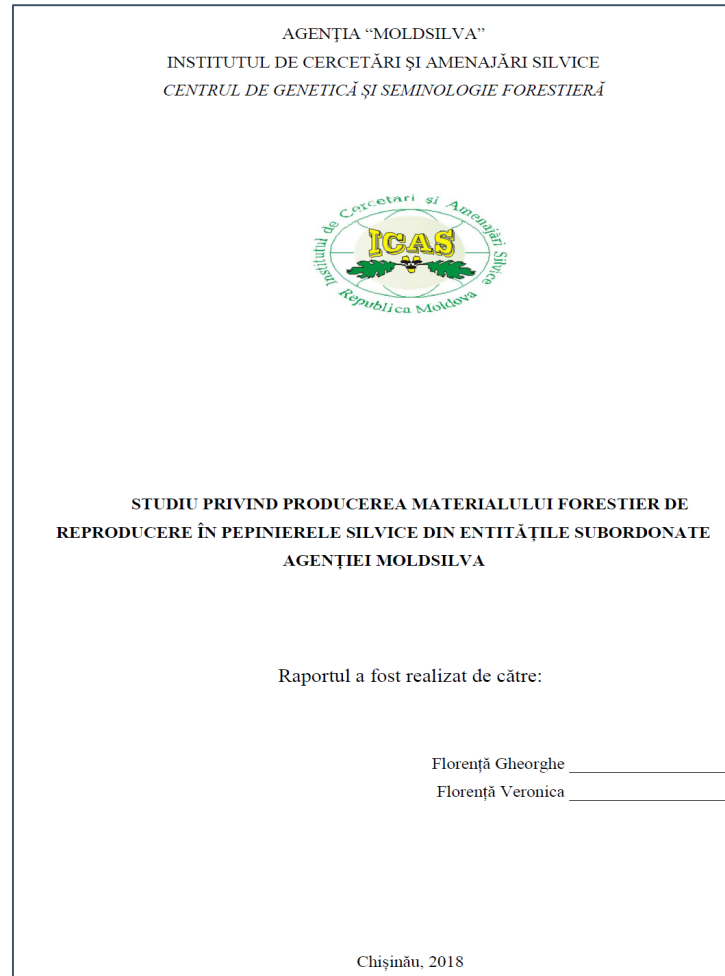


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Data sources



- **analysis of relevant information, legislations, policies and technical guidelines**
- **available statistical data, governmental documents and reports**
- **two meetings were organized with the relevant actors from the forestry sector**

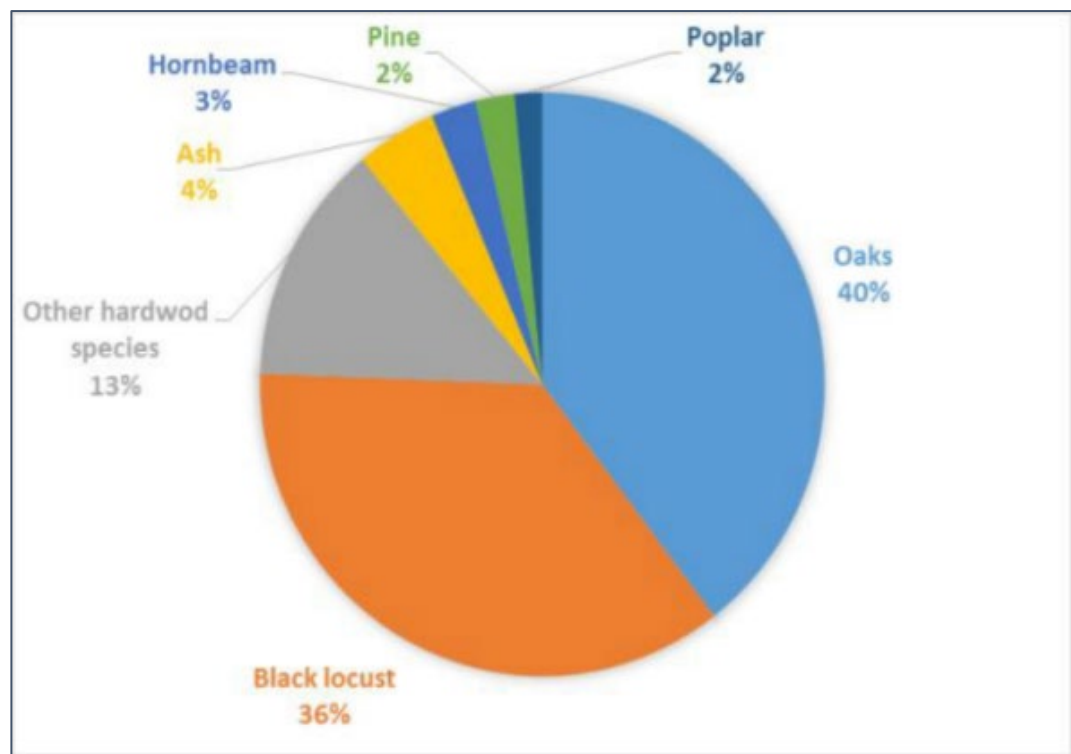


Low coverage of forest areas

- **The share of forest area 11.4% of the land area**
 - 386.5 thousand ha of forests
 - 75.1 thousand ha of other wooded lands
- **The majority of forests are located in the central part of Moldova**
- **Predominant public ownership**
 - 85.7% of the forests are owned by the State
 - 13.6% by Local Public Authorities (LPAs)
 - 0.7% is private ownership



Data regarding forest characteristics



- **43%** of Moldavian forests are of natural origin
- The forests are mainly broadleaved
- **Oak-type forests currently cover 44% of the forestland**
 - only 27% of oak stands are regenerated from seeds
- **Black locust (*Robinia pseudocacia*) covers 36% of the forestland**
 - largely used for afforestation projects on marginal lands
 - it is considered almost naturalized
 - increasingly preferred by households or landowners for its benefits

Main environmental problems



- **Soil erosion is a major environmental problem in the Republic of Moldova**
 - 55% of the current level of arable land is affected by erosion
 - 48% of the pasturelands are directly affected by different unsustainable uses or practices
 - Most of these lands are under private or communal (LPAs) ownership
- **Water shortage and extreme dry seasons**
 - The agricultural sector has strongly relied on the practice of forest protection shelterbelts
 - Some of them were affected by illegal logging



Need for action

- **combating soil degradation, soil preservation and increasing soil fertility**
- **the creation of stable forest ecosystems by restoring forests of the natural species composition**
- **the creation of fast-growing tree plantations to address the high demand for firewood in rural communities and to tackle the illegal logging**



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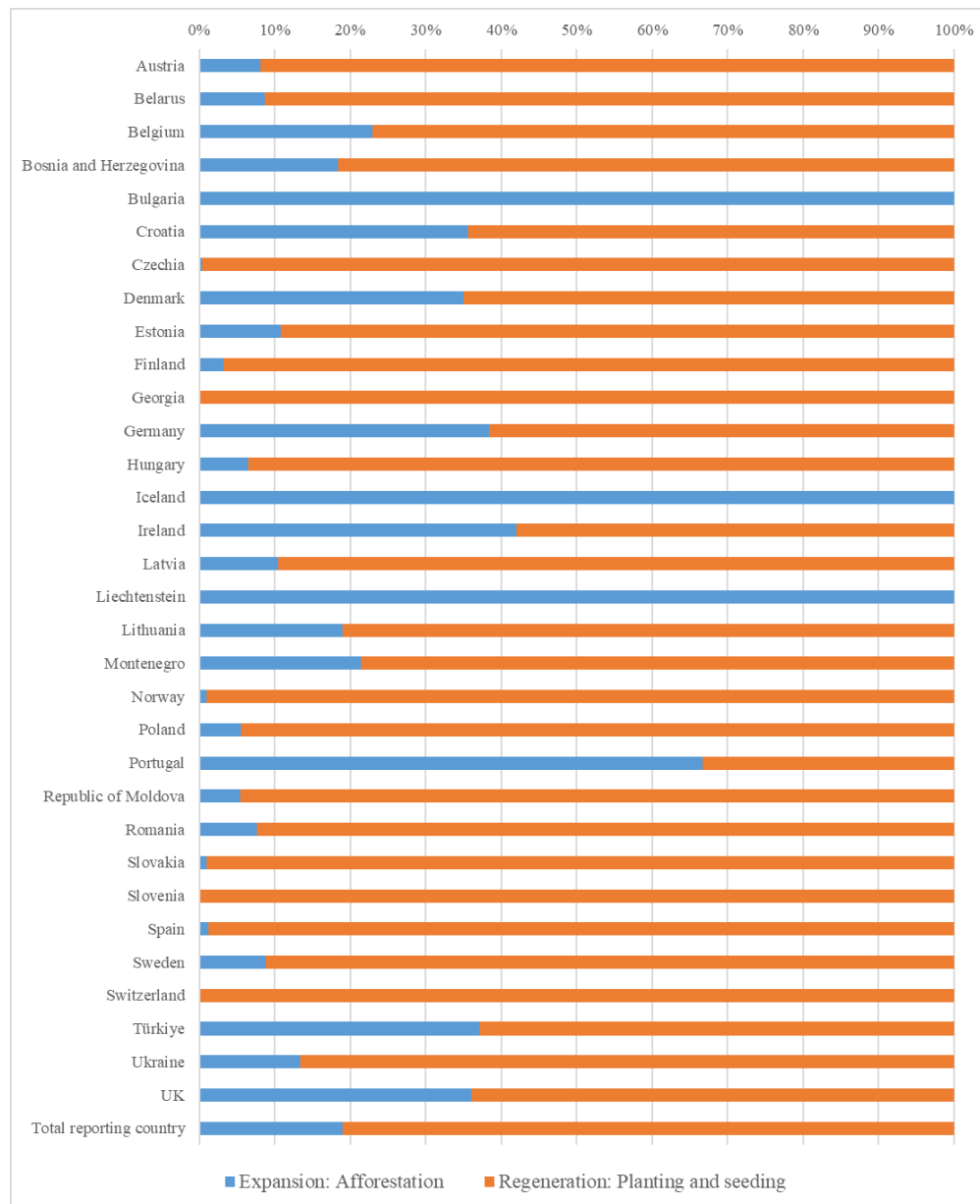
2. Interfacing the European and Moldovan ways for reforestation, afforestation and forest landscape restoration

*Ciprian Palaghianu, University "Stefan cel Mare Suceava",
Romania*



Main use of artificial regeneration in Europe

Joint Pan-European Data Collection 2015



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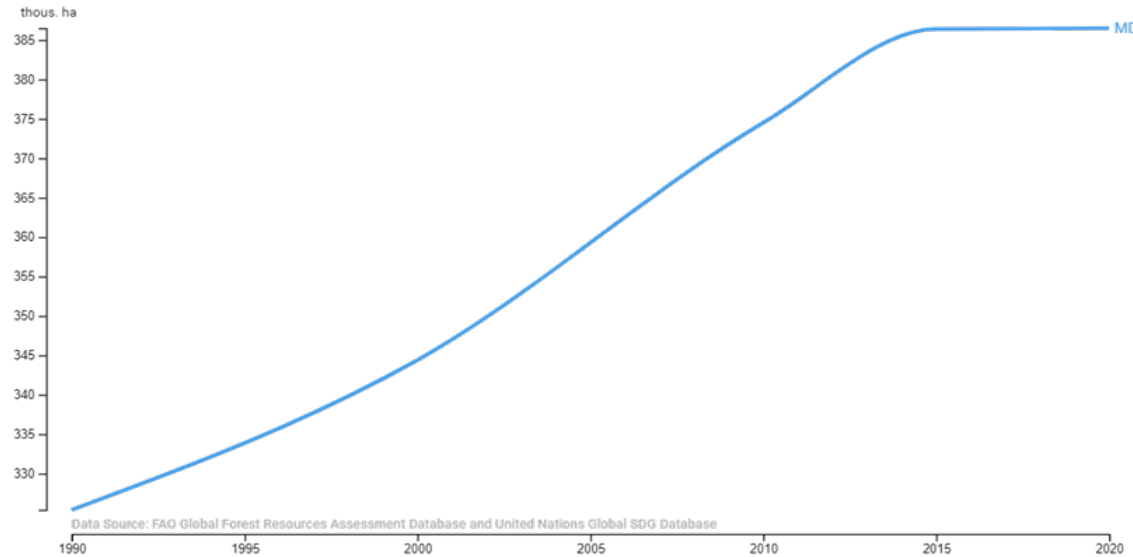


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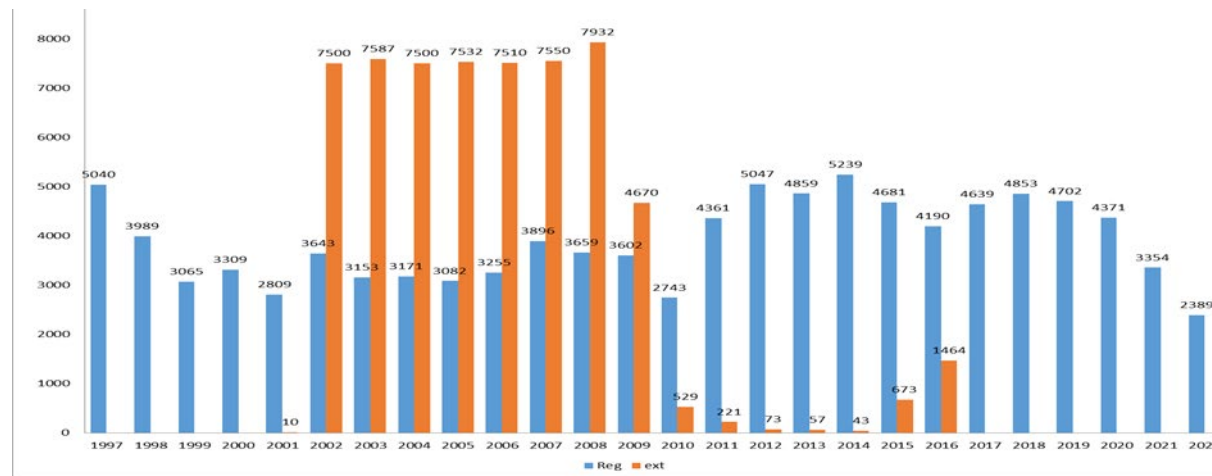
Achievements in Moldova

The forest area has constantly increased from 1990 to 2015 with more than 60 thousand ha

Evolution of forests areas from 1990–2020



Reforestation vs. forest expansion through afforestation



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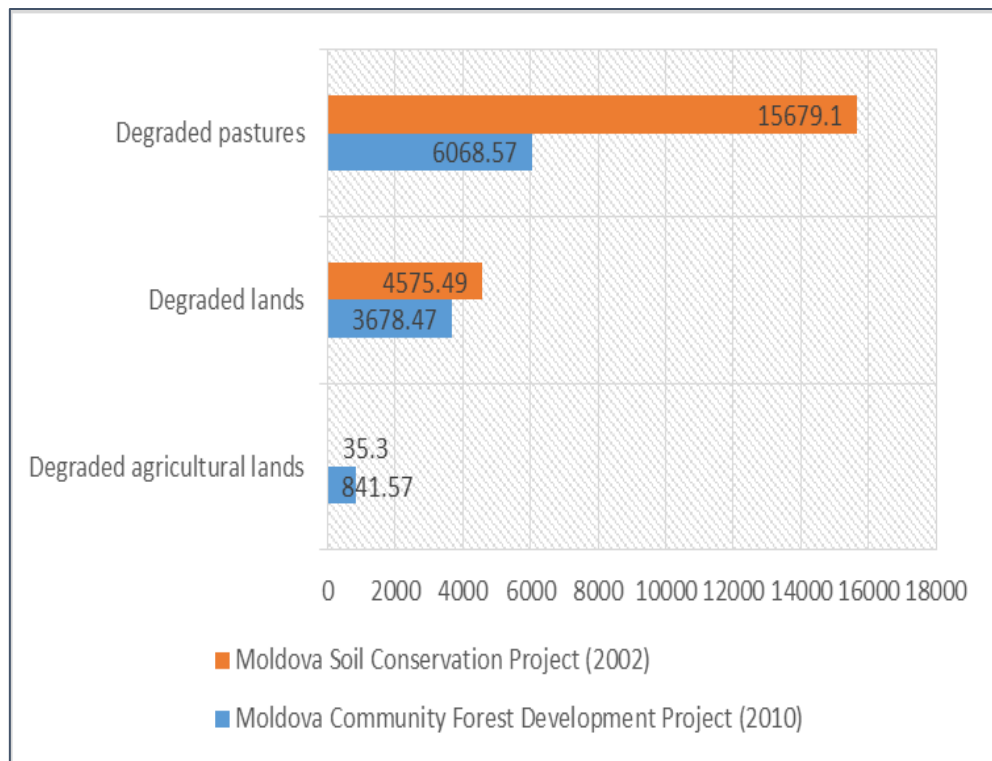


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Afforestation projects – international support



- **Moldova soil conservation projects (2002 - 2009) implemented by WB/Moldsilva Agency/FRMI**
 - 20.3 thousand ha of eroded and unproductive lands
- **Moldova Community Forest Development Project (2006-2011) implemented by WB/Moldsilva Agency/FRMI**
 - 8.5 thousand ha of eroded and unproductive lands on communal land



FRM production and the region of provenance



- **The FRM regulations are provided by the European Directive 1999/105/EC**
- **Ensure that traceability of the planting stock during the collection and production process to a registered source of basic material**
- **Moldova: Law regarding the production, marketing and use of forest reproductive material (March 2022)**



Production capacities in forest nurseries in Europe



- In Europe, production and trade of coniferous FRM are mainly undertaken by Scandinavia and the Baltic countries, while Central Europe is more reliant on broadleaved species.
- Sweden - 400 million seedlings
- Finland - 180 million seedlings
- Poland - 750 million seedlings

- Containerized stock vs bare-root stock
- Republic of Moldova - solid potential for sapling production considering the ratio between the total area of nurseries or seedling production and its forest cover.

EU Forest Strategy 2030



Brussels, 16.7.2021
COM(2021) 572 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS

New EU Forest Strategy for 2030

{SWD(2021) 651 final} - {SWD(2021) 652 final}

- **ensuring forest restoration and strengthening sustainable forest management to adapt to climate change and increase forest resilience;**
- **develop guidelines on biodiversity-friendly afforestation and reforestation;**
- **reforestation and afforestation to create forests with rich biodiversity;**
- **providing financial incentives for forest owners and managers to improve the quantity and quality of forests in the EU**



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General principle of the EU Forest strategy

Planting and growing

- the right tree
- in the right place and
- for the right purpose



Right tree, right place, right purpose



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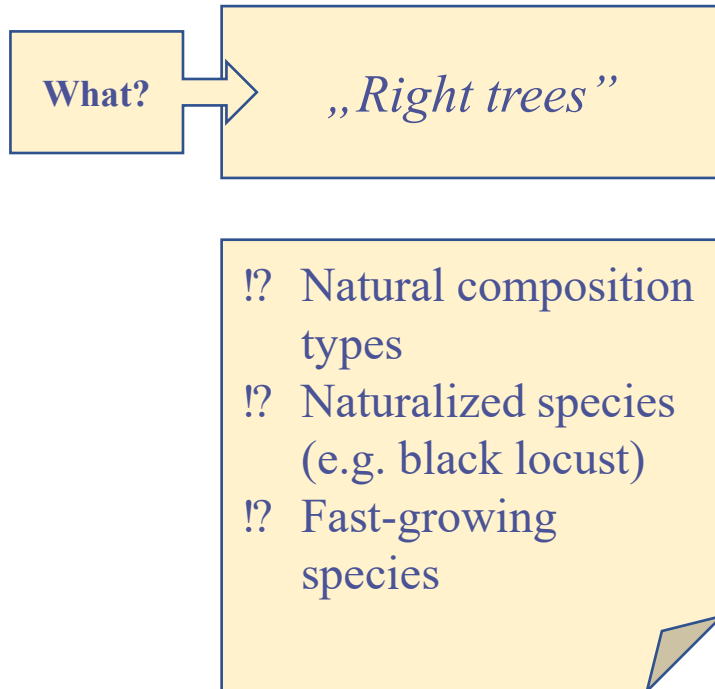


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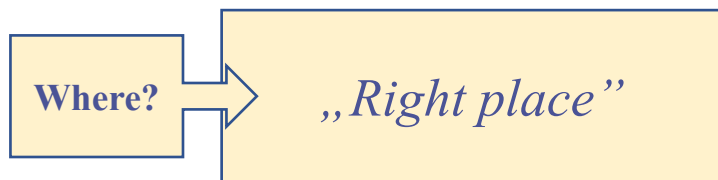
Strategic challenges for Moldova: the right tree



- **build healthy and resilient ecosystems**
- **find the species that can meet both the owners' expectations and the forest restoration objectives**



Strategic challenges for Moldova: the right place



- !/? Landscape planning approach
- !/? Availability of lands
- !/? Urban and peri-urban forests



- **address the afforestation projects in an integrative manner, prioritize financial and capacity-building resources**
- **the willingness of owners to change the land use from agricultural use to forest plantations is the most critical constraint factor**
- **reduce the pressure of the recreational activities in existing forest ecosystems**

Strategic challenges for Moldova: the right purpose

Why?

„Right purpose”

- !/? Afforestation of degraded lands
- !/? Forest restoration
- !/? Short-rotation forest energy crops

- the high share of degraded lands and the high costs of inaction
- stable forest ecosystems by restoring their natural types of species
- address the energy needs of the population



Technical challenges for Moldova: the FRM production

FRM production

!/? Industrial centres of production for afforestation plans

!/? Improved production in the current network of nurseries

- **The FRM production is embedded in the strategic decisions that need to be considered e.g. to set the species assortments and the yearly production capacities**



Technical challenges for Moldova: the workforce

Plantations

- !/? Increased investments in mechanisation
- !/? Training the personnel with modern methods
- !/? Open market competition

- **The shortage of skilled labour force impacts not only FRM production but also the capacity to perform planting activities**



Critical success factors

- the willingness to change the land use from agriculture to forest plantations
- the capacity to produce large quantities of forest reproductive material (FRM) for the envisaged afforestation projects
- lack of synergies between the strategic planning for afforestation and technical planning for FRM production



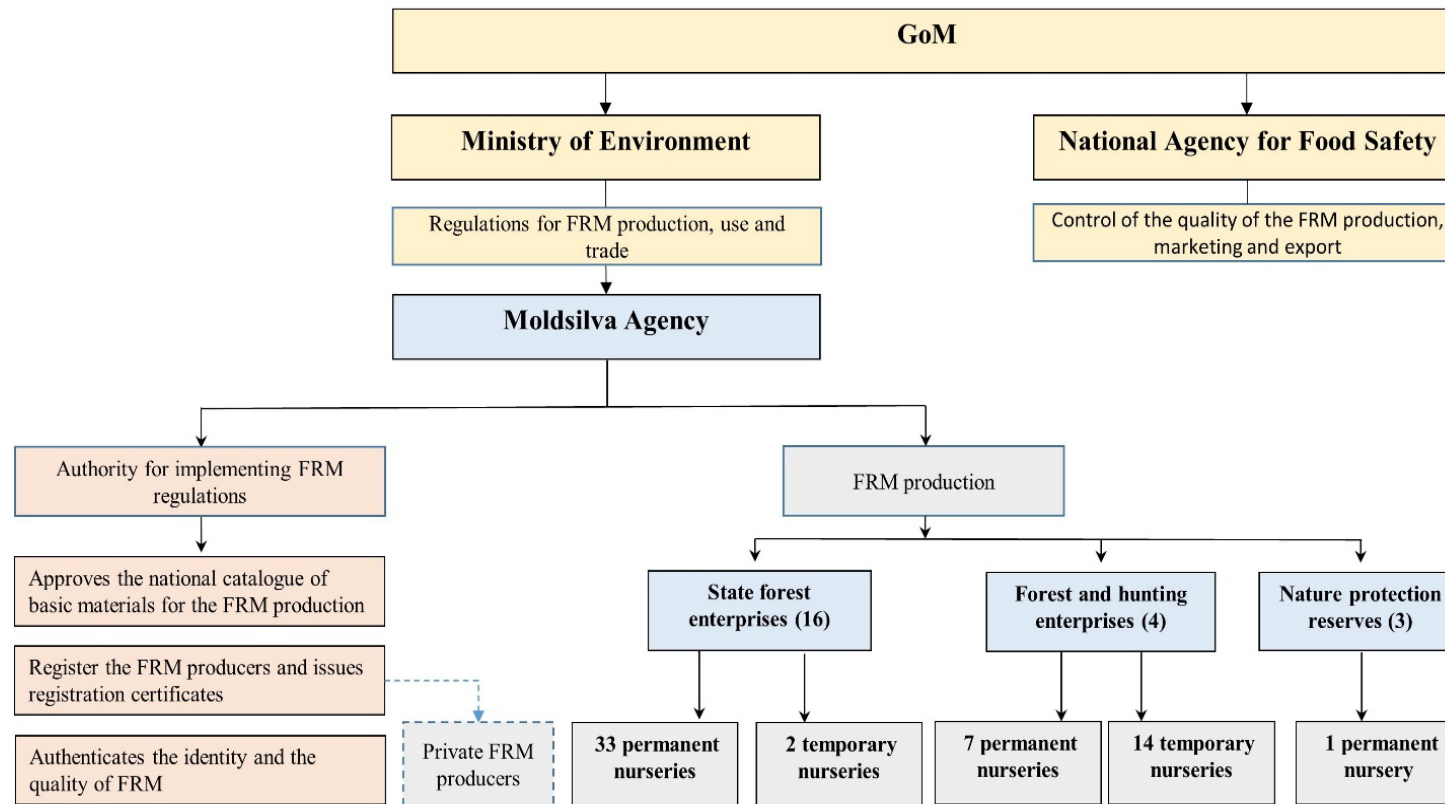
3. Analysis of the current situation of the sector of forest reproductive material in Moldova

Liviu Nichiforel, UNECE, International Consultant



Organization of the FRM sector

The institutional framework of FRM production in the Republic of Moldova (2022)



57 nurseries cover a total area of 962.3 ha



The existing nursery network

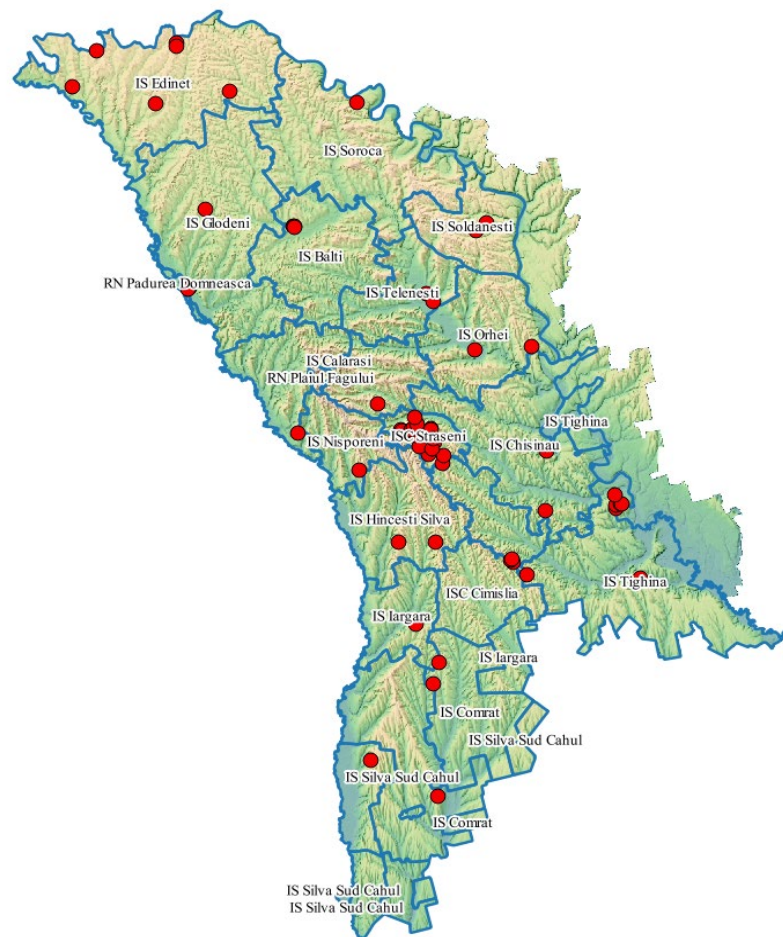


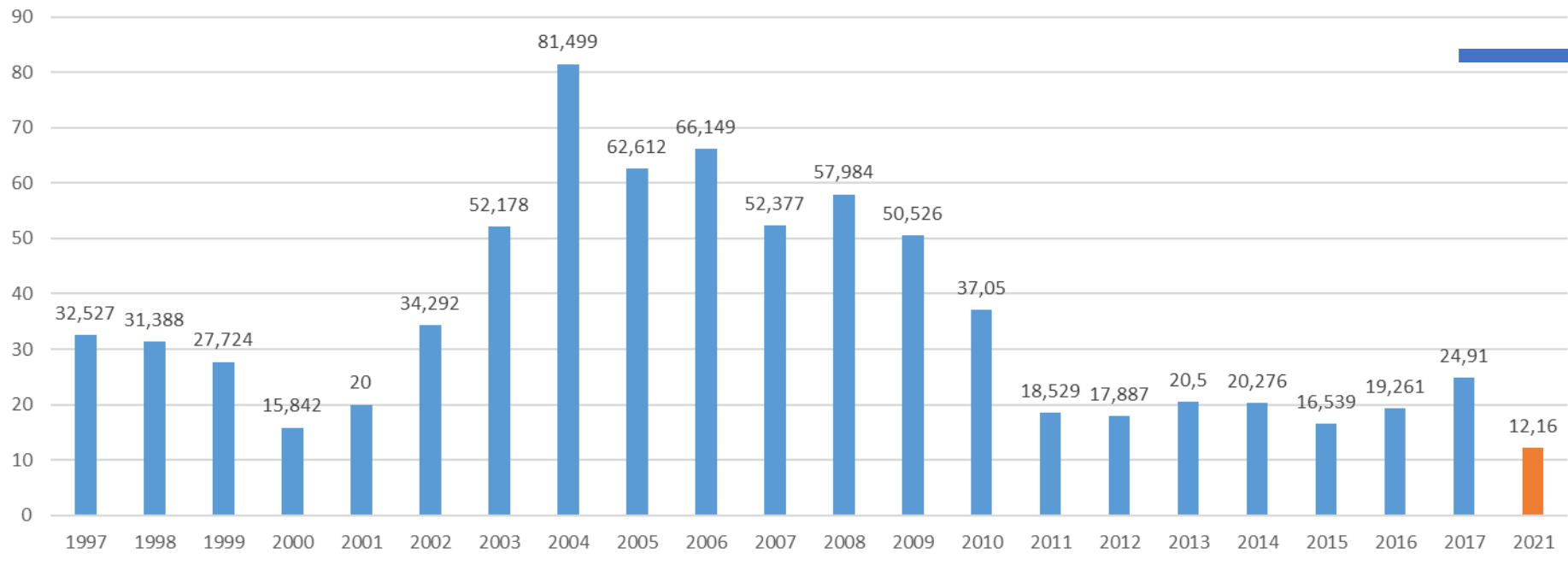
Table 3. Classification of forest nurseries by area category and duration of operation (2017)

Duration of operations	Size category					
	Small (<5 ha)		Medium (5 – 20 ha)		Big (>20 ha)	
	#	ha	#	ha	#	ha
Permanent	9	11.15	14	158.59	19	792.85
Temporary	18	14.77	1	10.3		
Total	27	25.92	15	168.89	19	792.85
%	44	3	25	17	31	80

FRM production capacities

Evolution of seedlings production in the nursery network of the Moldsilva Agency

seedlings, million



Estimated needs for FRM production



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Significant decrease in the production capacities

Production year	Total area with seedlings (ha)	Total seedlings production	Seedling production /1 ha
2021	45.31	12,160,610	268,000
Average production 2002-2020	144.68	33,050,000	228,000



Production capacities by species

Table 6. Seedling production by species (2017)

Species	Total	
	#	%
Coniferous	331 165	1.33
Oak species	2 555 263	10.25
Black locust	11 539 438	46.31
Honey locust	1 095 300	4.4
Juglans	1 212 498	4.87
Maple	1 689 000	6.77
Linden	228 064	0.92
Prunus	222 074	0.89
Willow	43 378	0.17
Poplar	68 616	0.28
Shrubs	2 289 930	9.19
Secondary species	3 643 213	14.62
Rosa species	200	
Total	24 918 139	100

- the black and honey locust accounted for half of the total number of seedlings produced
- Oak species represented only 10% of the total number of produced seedlings



Production capacities by the size of seedlings

Table 7. Seedling production by their size (2017)

Type	#	%
One-year seedlings	13,478,720	54.09
Two-year seedlings	10,464,717	42.00
tall saplings	974,702	3.91
Total	24,918,139	100

- the better-fit tall saplings more prone to increase the success rate of afforestation projects represented only 4%
- 82% of seedlings correspond to the standards in force but in some nurseries, the percentage can be as low as 15%
- there is currently no capacity for containerized seedling production of any species



Conditions of FRM productions

- **The current production capacity of the existing nurseries is used only to a small extent**
 - e.g. in 2017, 38.8% of the capacity was used, corresponding to 20 million seedlings
- **The mechanization of the production process is obsolete**
 - over 50% of the total equipment was produced in the 70s and 80s of the previous century
- **In most nurseries the access is done by ground roads and possible only in dry weather**



Conditions of FRM productions

- **The lack of water sources for crop irrigation**
 - in 2021, none of the nurseries that produced seedlings was able to use irrigation techniques
- **Updated soil mapping studies are largely missing, only in four cases the studies being realized after 2010.**
- **Every year considerable areas of sowing are lost, and the produced planting material is of low quality**



4. Assessed needs and plans on future afforestation and forest landscape restoration

*Ciprian Palaghianu, University "Stefan cel Mare Suceava",
Romania*



National strategies and plans

- **2001: Strategy for the sustainable development of the forestry sector**
 - extending the national forest cover to 15% through afforestation by 2020 (= 130 thousand ha of forest vegetation)
- **2014: The Environmental strategy of Moldova 2014-2023**
 - the expansion of forest areas to 15% of the country's territory
 - the increase of natural areas protected by the State up to 8%
- **2014: Moldova's climate change adaptation strategy**
 - reaching the afforestation degree of 15%
- **2014: The National Plan for extension of forest coverage for 2014-2018**
 - the afforestation of 13 thousand ha (10,300 ha restoration of degraded lands and 2,700 ha of new riparian buffers and forest belts)
- **2020: The Land improvement program for the sustainable management of soil resources for 2021-2025**
 - afforestation of lands subject to landslides on 162 ha of agricultural land by 2023, setting up/rehabilitating 90 ha of protective forest belts, 30 ha of agroforestry protective systems, 30 ha of riparian forest belts and 20 ha of forest belts for the protection of ravens
- **February 2023 - National Afforestation and Reforestation Programme for 2023-2032 (NARP)**



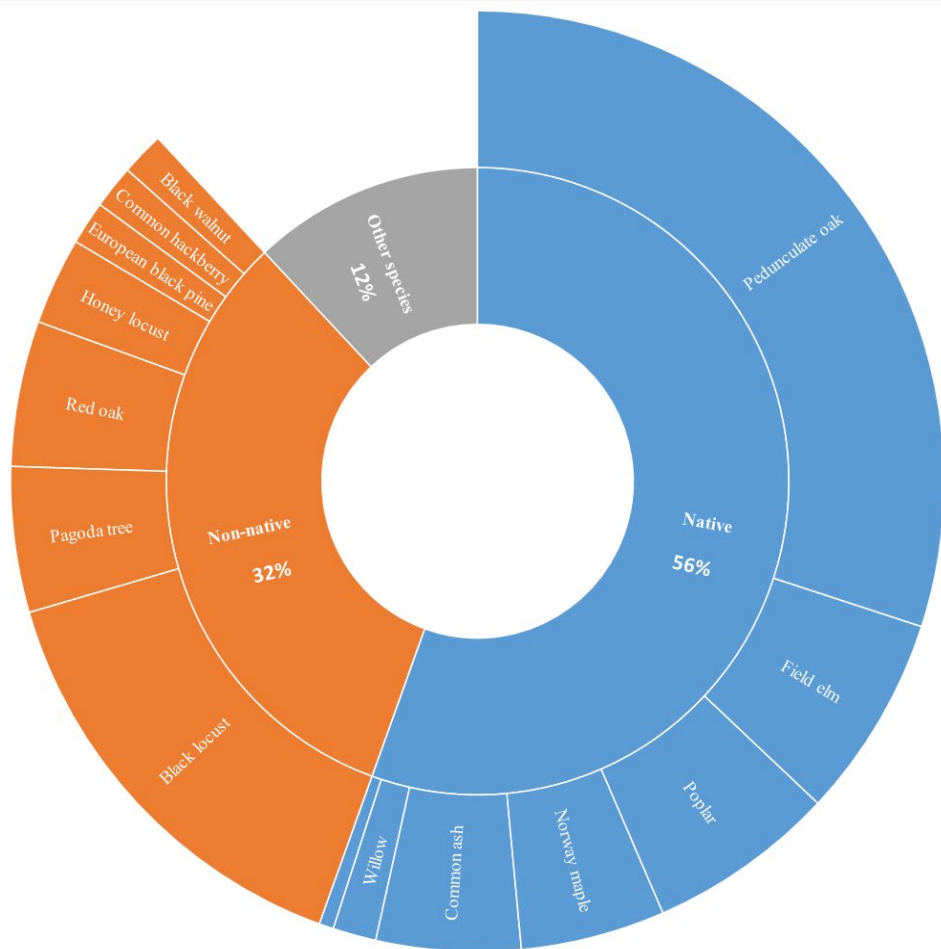
Needs for forest reproductive materials

Estimation of the needs for forest reproductive materials considering the current plans for afforestation and forest ecosystems restoration

Purpose	Annual needs (million seedlings)
Seedlings for the reforestation of existing forest stands	18 -20
Seedlings considering the current national afforestation plan (NARP)	48 – 60
Seedling for rehabilitation of existing forest ecosystems	No estimation



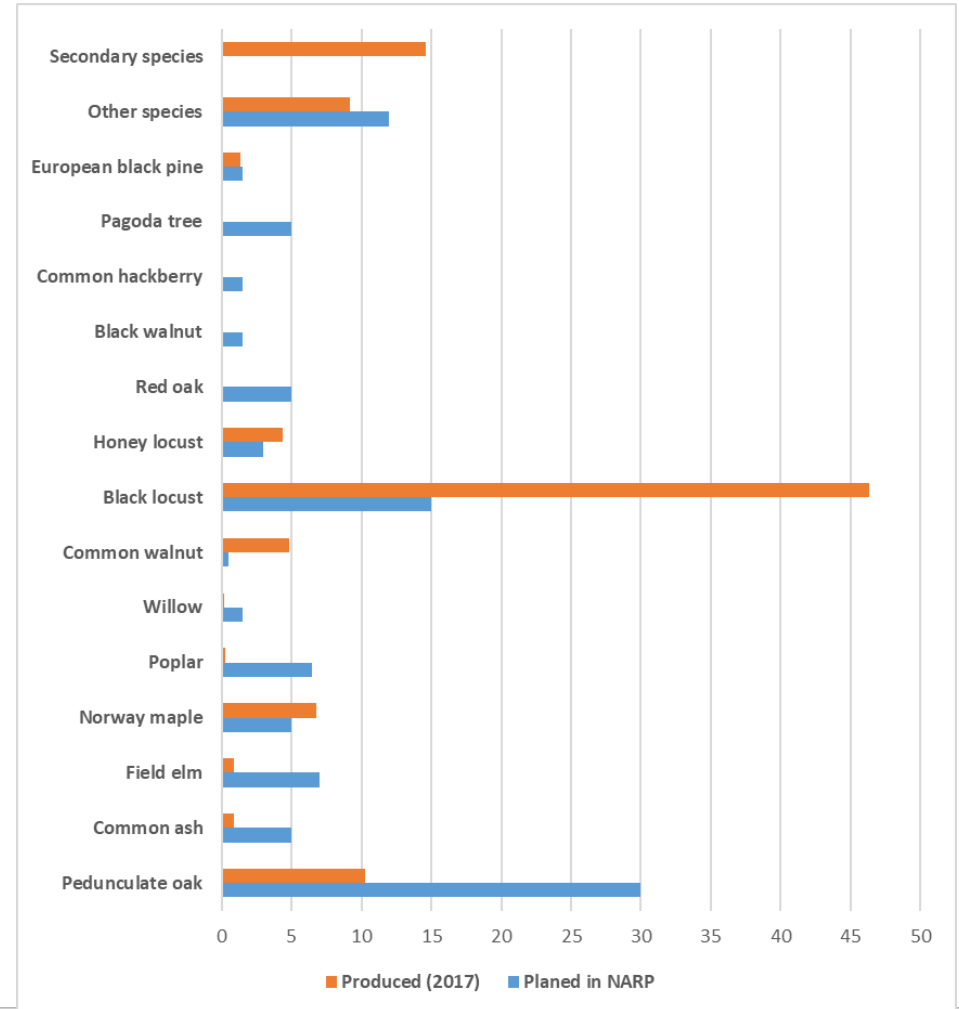
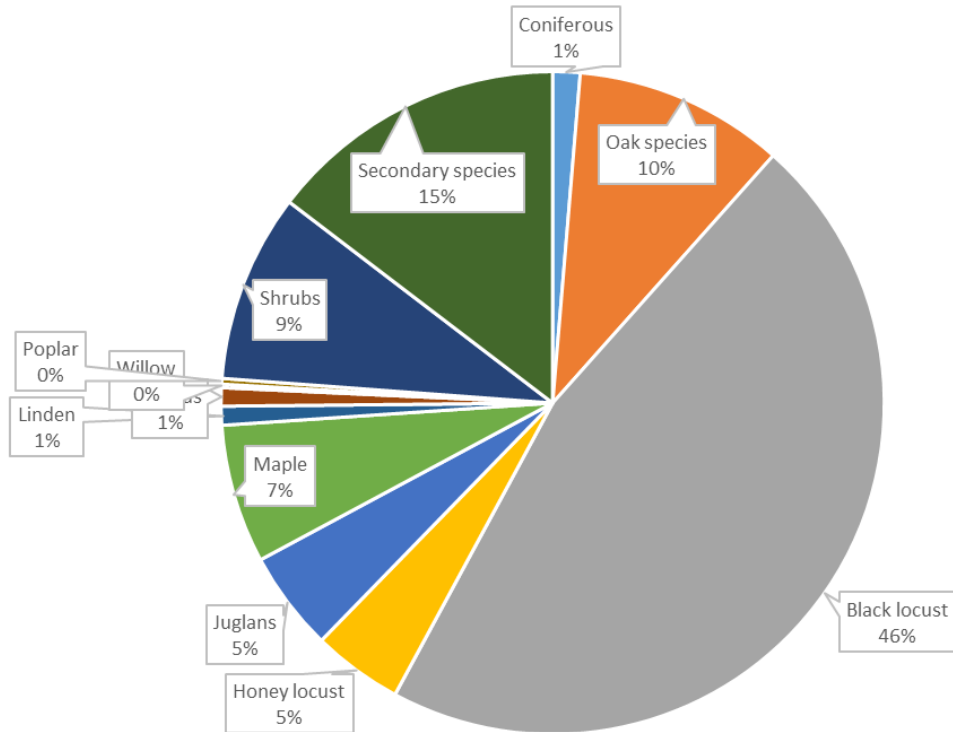
The estimated share of species for NARP implementation



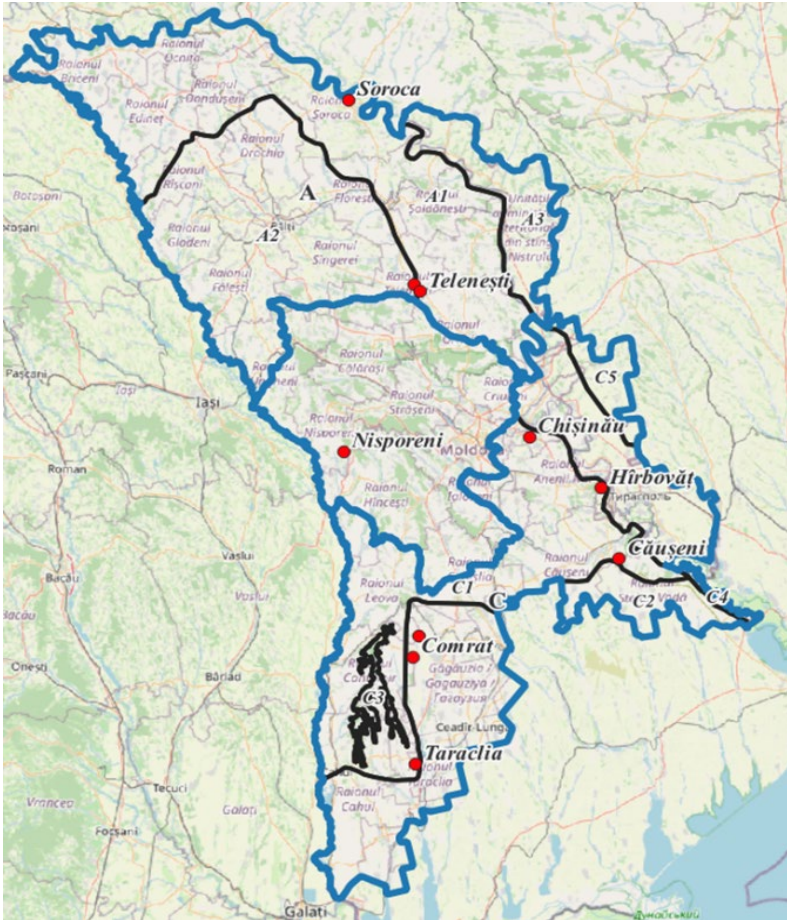
- **Pedunculated oak is the main native species (30% of the estimated needs for seedlings), with an annual planting area of 2 400 ha**
- **Other planned native species are common ash, field elm, Norway maple, poplar, willow, common walnut**
- **Non-native species represent 35%, with black locust having a share of 15%, corresponding to 1 200 ha afforested annually**

FRM production capacities: current production vs. needs

Seedling production by species (2017)



Plans for the development of FRM production



- **Creation of 3 centres for industrial production**
 - the establishment of the **National Centre for Forest Genetics and Seeds**
 - the production of 15-25 million seedlings
 - estimated cost of 2.6 million Euros
 - the establishment of **two additional centres**
 - the industrial production of 40 million forest seedlings
 - estimated cost of 4 million Euros
- **A feasibility study is currently performed for the selection of the best alternatives**

Criteria used by FMRI

- **The size of nurseries**
- **The access road to the nurseries**
- **The distance to the nearest locality**
- **The source of irrigation water**
- **Access to the electricity network**
- **Updated soil mapping studies**
- **Existing infrastructure**
- **The mechanization status of the nurseries**



Technical level recommendations

- **The critical element that determines the feasibility of NARP is the capacity to produce sufficient quantities of FRM**
- **New equipment and technologies are urgently needed**
 - provide planting material with a protected roots system for at least 3-5 million seedlings in the next five years
 - install modern irrigation systems for efficient water use
 - ensure qualified personnel in the nurseries and the field, provide training courses for the new technologies and methods
- **Opening private markets in the production of FRM should also be considered to support FRM production and speed up the introduction of innovative techniques**



5. Findings and Recommendations of the Study

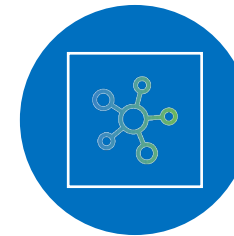
Talaibek Makeev, UNECE



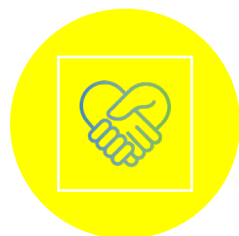
Structural and knowledge gaps to be addressed



Revisit existing normative regulations and revise them



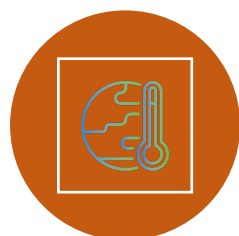
Clearer separation of management and controlling function for FRM production to allow private producers to get a stake of the market



Opening and development of the FRM private market



Assortment of the species produced in the nurseries and the quality of the seedlings in favor of productivity and native species



Adapting FRM to climate change



More studies to understand the adaptive genetic potential of forest tree and their response to environmental changes



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Policy level measures required

Support implementing a landscape planning approach for the afforestation

Align the strategic planning with the EU requirements on forest restoration

Development of the FRM Sector tightly linking with the overall NARP Strategy

The NARP Strategy should be further elaborated into more detailed Action Plans

Implementation of the NARP should be consecutive with an adaptable pace and available resources as well as comprehensive

Action Plan is to cover the entire production chain including its main components e.g. availability of land, proper planning, availability of seeds, seedling production capacity, planting capacity

The concentration of resources and efforts as well as choosing smaller but well-funded and well supported projects

In-depth cost-benefit assessment based on an improved set of indicators, to identify the efficiency of the existing network of nurseries



Upgrade capacities for meeting NARP targets

Setting clear area targets depending on land availability and defining the purpose of afforestation projects to plan the production of FRM in a relatively short period

New approaches, new equipment and technologies are needed to update the current state of nurseries and afforestation infrastructure

Introduction of innovative techniques, re-organization, modernization, and privatization of forest nurseries in order to increase and sustain reproductive capacity of nurseries

Creation of industrial centres for FRM production



Questions for Group Work

- 1) Which of findings and recommendations of the Study the best fit needs of the national programme and its action plan?**

- 1) Which area under the subject of the Study requires additional capacity building, research work and technical assistance?**



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Thank you!

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