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ABBREVIATIONS AND ACRONYMS

AAC	Annual Allowable Cut
ASM	Academy of Sciences of Moldova
BAU	Business as Usual
CPS	Country Partnership Strategy
CSO	Civil Society Organization
ECE	Economic Commission for Europe
ENA FLEG	Europe and North Asia - Forest Law Enforcement and Governance
ENPI FLEG	European Neighbourhood and Partnership Instrument - Forest Law Enforcement and Governance
EU	European Union
ENFIN	European National Forest Inventory Network
ES	Ecosystem services
FAO	Food and Agricultural Organization
FD	Forest District
FIRSM	Strategy for Institutional Reform of the Forestry Sector in Moldova
FLEG	Forest Law Enforcement and Governance
FMP	Forest Management Plan
FPN	Forest Policy Note
FSLM	Forest and Sustainable Land Management
FTP	Forestry Technology Platform
GEF	Global Environment Facility
GD	Government Decision
GDP	Gross Domestic Product
GHG	Green House Gases
GoM	Government of Moldova
ICAS	Institute for Forestry Research and Management Planning
IUCN	International Union for Conservation of Nature
LBA	Legally Binding Agreement
LPA	Local Public Authorities
LULUCF	Land Use, Land Use Change and Forestry
MDL	Moldavian Lei Currency
MoE	Ministry of Environment
Moldsilva	Agency Moldsilva
NBSAP	National Biodiversity Strategy and Action Plan
NEN	National Ecological Network
NGO	Non-Governmental Organizations
NFI	National Forest Inventory
NFF	National Forest Fund
NFMS	National Forest Monitoring System
NPV	Net present value

NOS	National Office for Statistics
NTFP	Non timber forest products
PA	Protected area
SA	Social Accountability
SEM	Sustainable ecosystem management
SHFM	Society of Hunters and Fishermen of Moldova
SRA	Strategic Research Agenda
SRF	Short Rotation Forestry
TA	Technical Assistance
TP	Technology Platform
UNDP	United Nations Development Program
UNFCCC	United National Framework Convention on Climate Change
WB	World Bank
WWF	World Wide Fund for Nature

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[1] The Team comprised Andrew Mitchell (World Bank, Task Team Leader, Sr Forestry Specialist), Arcadie Capcelea (WB, Sr Environmental Specialist), Nina Rinnerberger (WB, Climate Change Specialist), Henry Phillips (FAO, Senior Forestry Consultant), Bogdan Popa (Forestry Consultant) and Aurel Lozan (Forestry Consultant).

EXECUTIVE SUMMARY

1. This Forest Policy Note, prepared by the World Bank, offers an outside view of the Moldovan forest sector, provides some strategic advice to help define sector goals, and identifies opportunities for consideration in the continued development of the sector and in the implementation of the Moldova/World Bank Country Partnership Strategy.

2. ***Moldova has relatively low total forest cover, amounting to 11% of the land area (379,300 hectares)*** which compares unfavorably with the European average of 45% but is similar to other countries such as the UK (12%) and Denmark (13%). Forests tend to occur in hilly areas with the majority of forests located in the central part of Moldova, with slightly less forests in the north and even fewer in the south. The forests are mainly broadleaved (oak, ash, hornbeam, black locust and poplar being the most significant species) with planted non-native conifers accounting for just 2% of the forest area.

3. While Moldova's recent economic performance has helped ***reduce poverty and promote shared prosperity,*** poverty still remains an issue with 45% of the population surviving on 5 USD per day or less. The majority of the bottom 40% of the population lives in rural areas (75% of the poorest 40% of the population lives in rural areas). Many rural households depend on Moldovan forests as important source of fuel for heating and cooking, and non timber forest products (NTFPs e.g. berries, nuts, mushrooms, pasture for grazing and fodder etc.) for subsistence and income.

4. ***The forest sector's direct economic contribution is relatively small at just 0.27% of GDP in 2010***. Additionally the forests provide critical habitats for biodiversity and other essential environmental benefits such as soil protection, water regulation and carbon sequestration. The value of the direct forest ecosystems services (e.g. wood, Non Timber Forest Products – NTFPs.) is estimated at around 28 million USD per year. Under business as usual predictions, forestry activities may add 0.6 million USD per year over the next 25 years to the economy. However, this will disappear after 27 years as the capacity of ecosystems is eroded due to climate change and forest degradation. This ignores the losses in other forest ecosystem services e.g. carbon sequestration, water/soil erosion regulation and tourism.

5. ***Forest Management and Institutions:*** The State Agency Moldsilva is the central public authority (subordinated directly to Government) and is responsible for implementing state policy in forestry and hunting. Moldsilva also has both management as well as regulatory and administrative functions. Whilst single forestry institutions responsible for all aspects of state forestry were once common practice, many countries have now separated these functions so as to avoid the potential for conflicting interests. Moldsilva has 25 subdivisions encompassing 16 state forest enterprises, 4 state forestry and hunting enterprises, 4 natural reserves and the Forest Research and Management Institute (ICAS). Moldsilva manages 83% of the National Forest Fund (NFF - forest, land for afforestation and land designated in the national cadaster as forest), other state institutions (e.g. Botanical Garden, Central Authority for Waters) manage a further 4%, with the balance being owned and managed by Local Public Authorities (LPAs). Moldsilva, which is essentially self-financing, had revenues and expenditures in 2013 of 20.46 and 21.51 million USD respectively.

6. In 2012, the participatory preparation of a national Strategy for ***Institutional Reform of the Forestry Sector in Moldova (FIRSM)*** was launched with support from the EU funded European Neighborhood and Partnership Instrument (ENPI) East countries Forest Law Enforcement and Governance (FLEG) Program. The FIRSM advocates:

> *the separation of the management from the regulatory and control functions; the strengthening of the institutional capacity; the development of a more market-based economy within the sector; as well as the need for the continued development of consensus among the main stakeholders*.

Although the strategy was broadly supported by a wide range of stakeholders, it did not receive final government approval.

7. ***Unregulated and unsustainable levels of harvesting:*** The annual allowable cut (AAC) and the officially recorded actual harvest is around 400,000 m^3/per year. This equates to 32% of the annual increment (EU average 58%). Moldsilva undertakes the majority of its own harvesting and operates a centrally approved price list. However, analysis completed under the ENPI East FLEG Program estimates the total consumption of fuelwood at just under 1.1 million m^3 per year, *nearly 3 times the official harvest*. This represents 80% of the total increment. The difference between the officially recorded removals of around 400,000 m^3 and the estimated consumption is assumed to be due to unregulated and uncontrolled harvesting. The gross value of this unofficial harvest is conservatively estimated as being between 15 and 17 million USD per year. While there can be a number of contributory factors to the imbalance between estimated consumption and official wood supply, the scale of the imbalance indicates significant volumes of illegal harvesting. *These levels of unofficial removals are unsustainable* as these harvests will be concentrated in areas of easy access and where there is limited control and monitoring, resulting in some areas becoming significantly degraded.

8. All forests managed by Moldsilva have up to date forest management plans (FMPs) while most of LPA forests do not. Moldsilva has capacity and staff to manage their forests whereas the LPAs are hampered by a lack of trained staff and

resources to manage their forests. Consequently disproportionately more unregulated harvesting occurs in LPA forest. In the absence of FMPs and arrangements for their active management and protection, LPA forest will continue to degrade and be over-exploited.

9. ***Currently small and medium sized enterprises (SMEs) are not well established in the forest and wood processing sectors***. The State Forest Enterprises (SFEs) undertake most of their own harvesting operations and the majority of the wood processing in the sector. The SFEs' processing machinery is obsolete and inefficient. The FIRSM recommends extending the sale of all timber competitively on a fair and open market to help achieve prices closer to the true market value and improve transparency. This would additionally encourage the development of SMEs in harvesting, haulage and processing sectors.

10. ***Moldovan forests are likely to be significantly impacted by climate change.*** Researchers expect that even small changes in temperature and precipitation could greatly affect future forest growth and survival. Within the 2010-2039 period, the phytosanitary conditions will change significantly in the north of the country where it is expected that areas susceptible to die back (trees drying out) will expand by circa 15-25%. By 2040-2069, conditions will deteriorate further extending southwards. Building stable, diversified forests adapted to climate change presents a significant challenge and will require ongoing measures including research on species selection, adaptive provenances and genotypes. The Draft Low Emission Strategy to 2020 highlights a number of possible mitigating actions including (a) afforestation of protection zones, (b) afforestation of degraded land, and (c) extending the areas covered with forest vegetation from outside the NFF, including agro-forestry and forestry-pasturing practices.

11. ***Moldova does not have a national forest inventory (NFI) and the scope of data currently collected falls short of many international reporting requirements.*** A combination of an NFI and the implementation of current legislative provisions regarding land registration would afford policy makers and other relevant stakeholders a more informed view of the resource and would also facilitate the required international reporting. Currently forest research is relatively short-term partly due to limited funding. There is no national forest research program and no national coordination of forest research. There is an immediate need to model the potential impact of climate change and to undertake an inventory/mapping of biodiversity to help develop Protected Area management plans.

12. ***Soil degradation in the wider landscape has increased*** due to unsustainable agricultural practices and/or poor management of waters and the degradation of forest belts. The agricultural sector is crucial for Moldova, both as an important part of the economy and as a source of rural employment. Moldova has unique agricultural land resources, characterized by productive soils, a high utilization rate (>75%) and rugged topography. Many of Moldova's pastures are either degraded or in poor condition, with 47% of agricultural land classified as degraded. A new program for conservation and increasing the soil fertility for 2011 - 2020 has been approved. The National Plan on extending forest vegetation for 2014-2018 envisages the afforestation of 13,000 ha of degraded lands and water protection forest belts with funding from the National Environmental Fund and other donors.

13. ***Despite a number of current challenges, the forest sector presents significant opportunities for sustainable development****:* increasing the forest area will provide additional benefits in terms of climate change mitigation and as a source of local employment, while fast growing forest energy crops offer the potential to relieve the pressure on forests from illegal felling while contributing to national targets for GHG reductions. Extending the forest belts network will also greatly assist in the fight against soil degradation and erosion. A holistic approach to soil degradation is required which includes improved livestock husbandry, soil management and agricultural practices, all of which have a role to play. Extension of forest management plans to forests owned by LPAs will represent an important step in their sustainable development as a community based natural resource. Additionally, the FIRSM highlights the need for a clear separation of the regulatory and administrative roles of various institutions, the need for more transparent and efficient administration of both state and communal or/and private forests as well as an increasing involvement of the private sector in forest resource use and conservation.

14. ***Helping to improve forest sector performance and increasing the sustainability of landscapes will also contribute to reducing poverty and increasing the wealth of the bottom 40% of the population*** by: creating and sustaining rural based jobs from increased harvesting and processing opportunities (and the establishment of new SMEs); the provision of subsistence products such as fuelwood and NTFPs; improving agricultural productivity and ameliorating land degradation; and improving the productivity from pasture. Improving the holistic management of landscapes can help reduce the incidence and scale of damage from catastrophic events such as landslides, flooding and forest fires.

15. ***Strong Government commitment and institutional and stakeholder buy-in and ownership*** are required to support the reforms and actions necessary for the sustainable development of the Moldovan forestry sector. A number of specific interventions are proposed. In an optimal scenario, all the recommendations presented in Table 1 below would be

implemented. The optimal scenario is ambitious but would provide significant economic, social and environmental benefits for Moldova and the forestry sector in the longer term.

16. ***The optimal scenario includes modernizing the forest sector institutions and recommencing the institutional reform effort (highest priority), while building the capacity of and strengthening forest institutions.*** These initial efforts would be followed by other high priority actions, such as more fully engaging the private sector to develop rurally based Small and Medium Enterprises. In parallel, there are opportunities to increase Moldova's energy security through ensuring a sustainable wood supply, and for building and maintaining stable diversified forests adapted to climate change, which would help support Moldova's national and international commitments toward low-carbon development by reducing greenhouse gas emissions through increased carbon removal. There is an urgent need to expand the support the establishment of shelterbelts in the wider landscape to help protect agricultural soils, to reduce erosion and to prevent further degradation.

17. ***A number of medium priority actions are recommended*** in the areas of: combating unsustainable levels of wood removals from forests; introducing sustainable forest management plans for Local Public Authorities forests; developing strategic scientific research and technology transfer; and improving the public perception of the forestry sector and Moldsilva as part of an effort to increase its communication capacity.

18. ***At a minimum, the FPN recommends that the institutional reform process and implementation of the main objectives of the Strategy for Institutional Reform of the Forestry Sector (FIRMS) in Moldova recommence.*** The immediate priority should be to separate the management, control and regulatory functions, and strengthen the regulatory and monitoring capacity of the forest authority. Together these two measures will support the introduction of other reforms throughout the sector at a more opportune time.

19. Table 1 presents a summary of the challenges faced, the recommended reforms, the level of priority, and offers guidance on the sequencing of the recommended actions. The need for and the recommended actions in the sector are discussed further in chapters 6 and 7 of the main report.

Table 1: Recommendations for Forestry Sector Reforms

Challenge	Recommendations and Actions	Sequence
HIGH PRIORITIES		
Modernizing Forest Sector Institutions	**Institutional Reform:** The initial priority should be to separate the management from the control and regulatory functions and strengthen the regulatory and monitoring capacity of the forest authority (as part of the FIRSM). Together these two measures will support the introduction of other reforms throughout the sector.	**Highest priority**: *Recommence the institutional reform as soon as possible*
	Capacity Building: The envisaged institutional reform of the sector will require institutional strengthening and capacity building to ensure the knowledge and skill gaps necessary to support the reform are addressed. Capacity building should include a GIS based forest management information system (FMIS) to support the envisaged monitoring and supporting role of the central forest authority (especially for LPAs).	**High priority:** *Undertake concurrently with the reform process*
	Engaging the Private Sector: Following on from the initial reform efforts, other high priorities include more opportunities for engagement with the private sector. This should lead to the development of rurally-based SMEs providing services in areas such as harvesting, afforestation and other forest activities (e.g. NTFPs, reducing the dominance of the state sector).	
Ensuring a Sustainable Wood Supply	Woody biomass contributes to increasing the energy security of Moldova, improving the livelihoods of rural communities, as well as reducing the country's GHG emissions. A substantial part of the demand for wood energy is being met by illegally-harvested material. A national wood energy program with a target afforestation area using short rotation, high yielding forest energy crops (suited to the projected climate change impacts) could dramatically increase the supply of legally-sourced fuelwood.	**High priority**

Challenge	Recommendations and Actions	Sequence
Climate Change	**Adaptation:** Small changes in temperature and precipitation could greatly affect future forest growth and survival. Building and maintaining stable diversified forests adapted to climate change presents a significant challenge and will require on-going measures including research on species selection including adaptive provenances and genotypes.	**High priority**
	Mitigation: Moldova's Low Emissions Development Strategy (up to 2020), developed to allow access to fast start financing as well as long-term financing committed by developed countries under the 2009 Copenhagen Accord, recognizes the forestry sector for its contribution in reducing greenhouse gas emissions through carbon removal. While there are a number of constraints, the Strategy recommends a set of measures to maximize forests' contribution, which should be explored.	
Land Degradation and Afforestation	The Government of Moldova approved a Program for conservation and increase of soil fertility for 2011-2020 and a National Plan on extending forest vegetation for 2014-2018 which envisages the afforestation of 13,050 ha of degraded lands and water protection forest belts. A series of regionally based afforestation projects could be a first step to address land degradation, which will help create job opportunities, improve agricultural production, contribute towards climate change mitigation and adaptation and eventually reduce demand for illegally produced wood.	**High priority**
MEDIUM PRIORITIES		
Scientific Research and Technology Transfer –	A strategic research agenda (SRA) for the forestry sector would provide direction and prioritize research. The immediate need is to address the potential impact of climate change. Other important areas include the afforestation of degraded lands, biological disease control agents and the most appropriate species and cultivation methods for fast-growing energy crops. Inventory and mapping of biodiversity in PAs is also an important area for research. Applied GIS research would facilitate a cross-sectoral landscape approach to the research.	**Medium priority**
Unsustainable levels of production	The current level of removals (legal plus illegal) is unsustainable and will result in forest degradation, reduced production capacity and biodiversity loss. Actions are required which will (a) increase the volume of wood for heating e.g. increased *sustainable* levels of production from managed forests, establishment of fast growing energy plantations in the short term and increased afforestation in the longer term, (b) provide improved management and protection of LPA forests, (c) tackle local level corruption e.g. through FIRSM implementation and (d) provide alternative and affordable sources of energy for local population.	**Medium priority:** *Addressing illegal logging is urgent, but will need to build on the institutional reform process*
Management of Local Public Authority (LPA) Forests	LPA forests are under significant anthropic pressure from illegal harvesting and will continue to degrade unless remedial measures are introduced. The future of sustainable management of the LPA's forests will depend on a combination of the institutional reform to clarify roles and the introduction of forest management plans (FMPs) together with initiatives to secure professional management of these areas for the benefit of local communities.	**Medium priority**

Challenge	Recommendations and Actions	Sequence
Public Perception of Forestry Sector – *Enhancing the image of national forest management*	Existing surveys indicate that the public perception of forestry and the management of state forest resources will need to be improved. This could be achieved through increasing the communication capacity of Moldsilva. Additionally, while there would be little or no market advantage to Moldsilva becoming certified under either FSC or PEFC certification schemes, there would be benefits in terms of demonstrating to the public and indeed to the Government that it is managing forest resources in a responsible manner. Lastly, membership in FOREST EUROPE, the pan-European forest process, would offer many advantages and allow Moldova to align itself with the broader European forest community.	**Medium priority**

20. The World Bank is already active in a number of forestry and forestry related areas, such as for example, the Moldova Agriculture Competitiveness and GEF Sustainable Land Management Projects, two carbon sequestration projects and the ENPI East FLEG Program. There are clear opportunities for continued collaboration between Moldova and the World Bank in the forest sector. Support for the forest sector needs to be framed within the context provided by this FPN.

21. Based on the analysis and recommendations above, Table 2 shows the opportunities for collaboration with the World Bank to support the Moldovan forest sector development.

Table 2: Potential Areas for World Bank Assistance

Area	
Modernizing Forest Institutions including Forest Research	Support for management of the institutional reform change process Training and capacity building to underpin reform process Development of a forest management and information system Develop a Strategic Research Agenda Research on biological control agents Research in genetic resources identification and conservation Carrying capacity studies and inventories for game species Research in the area of forestry economics Research in the area of fast growing species and species Research in the area of climate change mitigation and adaptation measures Research on the landscape integration (agriculture and forestry) Development of research IT capabilities Research on the relationship between ecosystems, biodiversity and climate change
Building Sustainable Wood Supply	Planting of energy plantations (LPA) Trials for suitability of specific clones and cultivars Extension of Forest Management Plans to LPA community forests. Strengthening capacities of communal forest owners for sustainable forest management Ecological construction of degraded stands Design and implementation of a National Forest Inventory (NFI) Development of a national Forest Standard Support for GIS
Climate Change incorporating Landscape Approach Protected Area Management and Biodiversity conservation	Support for building stable diversified forests Support to investigate the most appropriate species and provenances Support for the building of stale diversified forests Support to investigate ecological adaptation to climate change Afforestation of degraded lands Support for nurseries to meet increased planting, ecological construction and improve quality Rehabilitation / replacement of forest shelter belts (Not in South) Trials of silvopastoral systems on pilot basis Preparing and implementing pilot project with the GEF Support for management planning of PAs including biodiversity inventories and mapping Support for ecosystem services identification and evaluation Eco-tourism infrastructure development Elaboration and implementation of conservation measures for endangered species and habitats Support for the implementation of the future NBSAP
Public Perception of Forest Sector	Public awareness campaigns linked with the implementation of the FIRSM and/or afforestation efforts

1 INTRODUCTION

1. This Forest Policy Note, prepared by the World Bank, offers an outside view of the Moldovan Forestry Sector, provides some strategic guidance to help define sector goals, and identifies opportunities for consideration in the continued development of the sector and for the implementation of the Moldova/World Bank Country Partnership Strategy (CPS). This study is based on a number of short visits to Moldova and on a number of background studies undertaken during the implementation of both phases of the European Neighborhood and Partnership Instrument (ENPI) East Countries, Forest Law Enforcement and Governance (FLEG) Program. The interest and willingness of Moldovan Forestry Sector Staff and other key stakeholders to freely engage in discussions with the Bank team[2] on a diverse range of topics is gratefully acknowledged. This draft of the Forest Policy Note has been revised in line with comments received following a stakeholder consultation held in Moldova during July 2014.

2. The World Bank (WB) Country Partnership Strategy (CPS) for Moldova[3] recognizes that the forestry sector plays an important role for competitiveness and climate change but has not received the attention it deserves. Low forest cover is a significant factor contributing to the high level of soil erosion, landslides, degradation of water resources, and intensified droughts[4]. The CPS identifies the potential for scaling up afforestation activities and proposes a Forest and Sustainable Land Management (FSLM) project while recognizing that research on the economic and social benefits of forests, including their role in providing ecosystem services, may inform a new national forest strategy to best meet sector needs in support of the country's economic development and climate change agenda.

3. The Environmental Strategy (2014)[5] identifies forests as strategic resources that need to be sustainably managed and adapted to the new conditions in addition to proposing landscape management and ensuring the well-being of society.

4. This Forest Policy Note (FPN) builds on previous work within the forestry sector. It aims to inform the World Bank project formulation process and the forestry sector by reviewing the sector and highlighting the main policy issues and identifying possible actions. This will assist in identifying and designing investment opportunities within the sector. It is not a forest policy, although it could serve as an input to a forest policy formulation process.

5. Moldova with a National Forest Fund of 13.6%[6], the greater proportion of which is state-owned and managed, compares unfavorably with the European forest cover average of 45%[7] but is on a par with Denmark (13%) and the United Kingdom (12%) but less than neighboring Ukraine (17%). The low forest cover is reflected in the sectors contribution to GDP being 0.27% in 2010 while wood products represented only 0.5% of the total exports and 1.7% of the total imports in 2012. However, forests represent an important source of fuel and energy for local populations and are an important source of biodiversity. In addition forests provide important environmental benefits in terms of soil conservation, water regulation and carbon sequestration. Forests are locally important as sources of employment with up to 10,000 seasonal workers employed annually.

6. Forests are under increasing pressures from a number of sources. Illegal felling (mainly for fuelwood and/or selective trees for commercial purposes) is at unsustainable levels. Poor wildlife management has impoverished forest ecosystems and illegal hunting (for sport or by poachers) is still common. Climate change will result in significant deterioration of forests especially in the southern part of the country with many species exhibiting decreased production and regenerative capacity and increased susceptibility to pests and diseases with knock-on impacts to forest ecosystems.

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[2] The Bank Team comprised Andrew Mitchell (Task Team Leader, Sr Forestry Specialist), Arcadie Capcelea (Sr Environmental Specialist), Nina Rinnerberger (Climate Change Specialist), Henry Phillips (FAO, Senior Forestry Consultant), Bogdan Popa (Forestry Consultant) and Aurel Lozan (Forestry Consultant).

[3] World Bank County Partnership Strategy for the Republic of Moldova for the Period FY14-17. Report No. 79701-MD**.** Belarus, Moldova and Ukraine Country Management Unit, Europe and Central Asia Region

[4] UNECE 2005, Second Environmental Performance Review

[5] The Environmental Strategy of the Republic of Moldova 2014-2023, approved by Government, April, 2014.

[6] National Agency for Cadastre – 1st of January 2014 (GD. 432/2014)

[7] State of Europe's Forests 2011 Status and trends in sustainable forest management in Europe. Report prepared by Forest Europe, UNECE and FA.

7. Despite the low forest cover and the pressures on forests, the sector presents opportunities for future sustainable development in areas such as (a) extension of the forest belts network and afforestation to help combat soil erosion and mitigate against climate change, (b) extension of forest management plans to Local Public Administration forests to support sustainably managed community based resources, (c) the planting of fast growing forest energy crops to relieve the pressure on forests and support emissions targets, (d) the improved management of protected areas and (e) ecosystem and eco-tourism development. These rurally based opportunities would provide much needed employment contributing to poverty alleviation.

8. The Strategy for Institutional Reform of the Forestry Sector in Moldova (FIRSM) prepared under the European Neighborhood and Partnership Instrument, Forest Law Enforcement and Governance (ENPI FLEG I) Program, highlights the need for a clear separation of the regulatory and administrative roles of various institutions involved in forestry, the need for more transparent, effective and efficient administration of both state and communal or/and private forests as well as an increasing involvement of the private sector in forest resource use and conservation.

1.1 Moldova Economic Snapshot

9. Moldova is a small landlocked country with an area of 33,850 square kilometers situated in South Eastern Europe, between Ukraine and Romania. The largest part of the country lies between two rivers, the Dniester and the Prut which forms the western border and joins the Danube before flowing into the Black Sea. While most of the country is hilly, elevations never exceed 430m. Moldova's hills are part of the Moldovan Plateau, which geologically originate from the Carpathian Mountains.

10. Moldova has a moderate continental climate. The summers are warm and long, with temperatures averaging about 20 C, and the winters are relatively mild and dry, with January temperatures averaging −4°C. Annual rainfall, which ranges from circa 600mm in the north to 400mm in the south, can vary greatly and long dry spells are not unusual. The heaviest rainfall occurs in early summer and in October and heavy showers and thunderstorms are common. Due to the irregular nature of the terrain, heavy summer rains often cause erosion and river silting.

11. The population of Moldova was 3.56 million in 2013[8], with an average population density of 120.4 persons per square kilometer[9]. During the period 1990-2012, the population decreased by 6.6% due mainly to emigration. The majority of the population is concentrated in the rural areas with circa 54% and urban 46%.

12. The country is divided into thirty-two districts (*raioane*, singular *raion*), three municipalities, and two autonomous regions (Gagauzia and Transnistria). There are 1,681 localities of which 982 have their own Local Public Authorities (LPAs), of which five have municipality status, 66 have city status, and 916 are villages with commune status. The remaining 699 villages are too small to have an independent administration, and belong to either cities (40) or communes (659). LPAs work on the basis of the autonomy principle and decentralization of local public services. Local autonomy is exercised through elected local councils and mayors. The Territorial Office of the State Chancellery is responsible for the administrative control of the LPAs.

13. Endowed with rich agricultural black soils and a temperate climate, Moldova has relied heavily on agriculture throughout its history. The surface area is roughly divided into 91% rural and 9% urban[10]. Agricultural land use covers about 74% of the area (of which circa 90% is privatized). It is estimated that 73% of agricultural land is arable, but only 12% is under permanent cultivation.

14. As a small open economy, Moldova's growth performance has been strong but volatile. The economy recovered from the 2008-09 global economic crisis with average annual GDP growth exceeding 5% during 2010-2013. However, growth has been volatile, reflecting vulnerability to climatic and global economic conditions. In 2010–11, remittances and investment fuelled domestic demand, and growth in exports was strong. Real GDP grew by 7.1% in 2010 and 6.4% in 2011. In 2012, GDP contracted by 0.7%, as the economy was hit by a drought-induced contraction in agriculture (-22.3%) and weaker external demand due to the Euro zone crisis. In 2013, growth rebounded, driven by a record harvest, with GDP increasing by 8% over the first nine months. Overall in 2013, agriculture accounted for half the growth with 41% year on year (y/y) increase.

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[8] Central Bureau of Statistics

[9] Third National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change. Ministry of Environment, Chisinau, 2013.

[10] Government Decision No. 468 of 26.07.2012

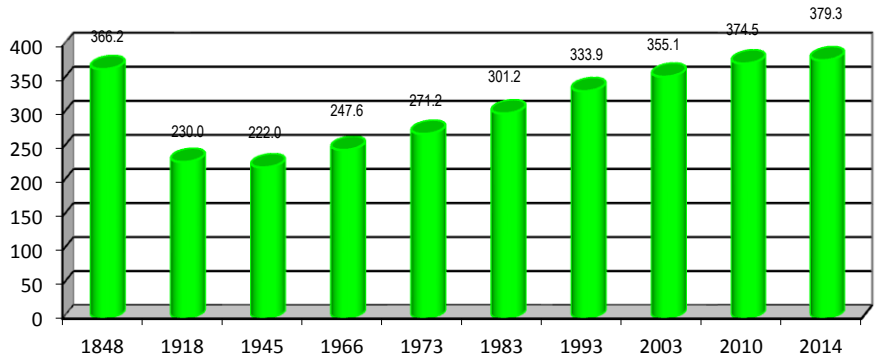
15. Moldova's recent economic performance has reduced poverty and promoted shared prosperity. The national poverty and extreme poverty rates fell from 30.2% and 4.5% in 2006 to 16.6% and 0.6% respectively in 2012, making Moldova one of the world's top performers in terms of poverty reduction. Similarly, consumption growth among the bottom 40% of the population outpaced average consumption growth: estimates for 2006-11 suggest an annualized overall growth in consumption of 2.9% over the period, as compared to 5.8% for the bottom 40 percent. These developments were driven by economic growth and the associated growth in earnings, as well as by an increase in private transfers such as remittances. However, evidence suggests that the bottom 40% are particularly affected by weaknesses in the quality and efficiency of health and education services, and especially vulnerable to climate shocks. Despite a sharp decline in poverty, Moldova remains one of the poorest countries in Europe. Based on the Europe and Central Asia (ECA) standardized poverty lines of US$ 5/day and US$ 2.5/day at Purchasing Power Parity (PPP), 55% of the population was poor and 10% was extremely poor in 2011. The most vulnerable groups at risk of poverty in Moldova remain those with low education levels, households with three or more children, those in rural areas (e.g. 75% of the poorest 40% of the population live in rural areas), families relying on self-employment, the elderly, and Roma. Moldova performs well in some areas of gender equality, yet disparities persist in education, health, economic opportunity, agency and violence against women. Human trafficking is an issue. Moldova is a source, and to a lesser extent a transit and destination country, for both sex trafficking and forced labor.

2 FORESTRY

2.1 Forest Resources

16. Moldova's National Forest Fund[11] (NFF) represents 13.6% of the total land area, accounting for 446,400 ha[12]. Of this some 349,300 ha are forests, the balance comprising forest areas under regeneration and areas for administrative forest needs. The current forest area is a consequence of the historic evolution of forests which over the past century have been a scarce resource and under intense human economic pressure (Figure 1). The proportion of forestland over the past two centuries varied from 30% to 6% (1918) since when it has shown a slow recovery to current levels.

Figure 1: Land covered with forests[13], ('000 ha)



17. The forest is concentrated mainly in the hilly area, and its distribution is uneven nationally. The majority of forestlands are located in the central part (so-called Codrii), less in northern part while the southern part has the lowest forest cover.

18. The forest is dominated by broadleaf species: oaks, ash, hornbeam, black locust and poplar being the most significant. Coniferous species are not native and represent only 2.2% of the forest area (Figure 2). Oaks are considered the most important and valuable species. Only 27% of oak stands are regenerated from seeds, with the majority regenerated vegetatively.

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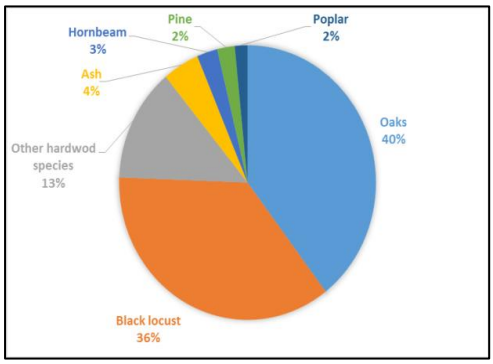
[11] The Forest Code, article 2 defines the NFF as "forests, lands for afforestation, lands for forest management, unproductive lands included in the Forest Management Plans or in the national cadastre as forests". The NFF does not include forest belts (agricultural, water banks roads or railways) gardens or parks.

[12] National Agency for Cadastre – 1st of January 2014 (GD. 432/2014).

[13] Moldsilva, 2013. Informative materials regarding Moldsilva Agency activity. Qualitative and Quantitative indicators of the forest fund, Moldsilva Agency and National Agency for Cadastre – 1st of January 2014 (GD. 432/2014).

Figure 2: Species composition in NFF[14]

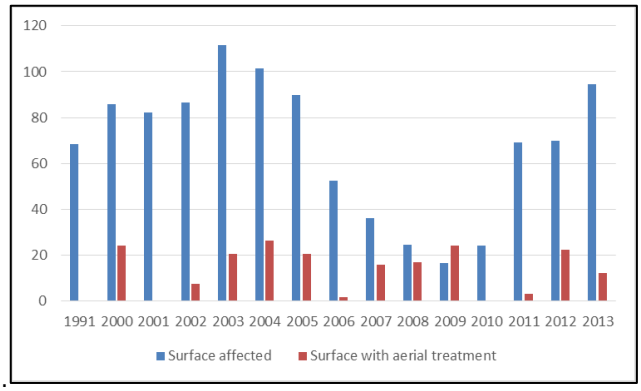


19. The current health condition of forests reflects the high pressure from unsustainable illegal harvesting practices and the risk from both biotic (pests, diseases) and abiotic (droughts, ice rain, pollution) factors. The frequency of droughts has increased over the last decades and has significantly affected forest ecosystems, especially in the south and central regions. According to the National Forest Monitoring System (NFMS) and pathological monitoring surveys undertaken by Moldsilva (www.moldsilva.gov.md) forest ecosystems are largely attacked by outbreaks of defoliator species, including exotic and/or invasive species (Figure 3). Moldsilva allocates significant financial and staff resources to trying to limit the extent and impact of outbreaks. Areas of between 4.6% (2009) and 31% (2003) of the NFF were affected by pests while up to 26.4% of the affected areas has been subject to chemical or integrated (chemical and biological control) aerial treatment on an annual basis. There have been discussions to revise the pest control strategy by adopting mixed approaches, but Moldsilva still undertakes aerial control measures using chemicals. The trend is however towards a mixed approach, including shifts/changes in forest management practices (e.g. close-to-nature, biodiversity enhancement etc.).

20. According to the National General Cadaster Registry[6] 81.1% of the NFF is owned by the state, 18.3% by Local Public Authorities (LPA), while private ownership at 0.6% is extremely low.

21. The Forest Code already states[15] that the main function of the forests is the protection of the environment and all the forests are considered to have firstly protective functions and secondly, production functions. There are five protection functional subcategories: 1.6% water protection, 7.9% soil and land protection, 47.4% climatic and industrial damaging factors protection, 26.4% recreational and 16.7% scientific interest or genetic resources protection[16].

Figure 3: Area affected by forest pests ('000 ha)17



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[14] Botnari F., Galupa D., Platon I. et al. (2011): State of the Forestry of the Republic of Moldova 2006-2010. Agency Moldsilva. Chisinau. – 60 pp. Report prepared under the ENPI FLEG Program.

[15] Art. 14 – Forest Code of Republic of Moldova

[16] Botnari F., Galupa D., Platon I. et al. (2011): State of the Forestry of the Republic of Moldova 2006-2010. Agency Moldsilva. Chisinau. – 60 pp. Report prepared under the ENPI FLEG Program

[17] Moldsilva, 2013. Informative materials regarding Moldsilva Agency activity. Qualitative and Quantitative indicators of the forest fund.

22. Forestry sector revenues represent between 0.27% (in 2010) and 0.5% (in 2000) of the country's GDP. In 2012, the wood products represent only 0.5% of total exports and 1.7% of total imports[18].

Table 3: Moldsilva Revenues and Expenditure ($ millions)

Year	Total Revenue	Timber Revenue	Total Expenditure	Wages Expenditure	Taxation	State Financial Contribution
2013	20.46	18.55	21.51	12.81	4.95	0.76
2012	17.28	15.56	18.28	9.40	4.32	0.35
2011	14.92	13.03	16.66	8.76	3.90	0.60

23. Agency Moldsilva is the dominant entity within the forestry sector and its revenues and expenditures provide an insight to the size of the sector. Its performance in recent shows an operating loss. It is heavily reliant on timber revenues which average circa 90% of total revenues. Wages are the single largest expenditure item averaging 55% over the period 2011-2013. The State contribution is relatively small and Moldsilva is essentially self-financing.

Table 4: Moldsilva Average Employment (Fullt tlme equivalents)

Year	Field Foresters	Staff / Engineers	Permanent Workers	Seasonal Workers	Total Employment
2013	1,032	1,245	590	1,214	4,082
2012	1,031	1,915	641	573	4,160
2011	1,049	1,601	607	932	4,189

24. Agency Moldsilva is the dominant employer in the sector. Analysis of employment data shows a decreasing trend from 2008 with 5,619 employed to circa 4,100 employed since 2011. An important category is seasonal employees whose number is estimated at up to 10,000 annually[8, 9] albeit employed for relatively short periods. This employment is rurally based and plays an important role in the stabilization of local communities through the provision of additional income possibilities. The official figures underestimate total employment as they refer solely to Moldsilva and ignore those employed under a barter system who provide services in return for firewood and those engaged in the grey and black economy (illegal harvesting). Employment is predominantly male especially where machinery is involved, however females are employed in planting and some silvicultural works.

25. Most sector analyses highlight the underused potential of the forestry sector. In particular through (a) carbon sequestration valued at $460,000 in 2011, (b) ecotourism which is valued at $7.9 million[19] per annum and employing circa 1,400[20] (c) watershed management reducing soil erosion and reducing water costs valued at an net present value of $27.8 million over 25 years, (d) flood disaster mitigation valued at $19.7 million and (e) wood energy which could be worth circa $2.25 million annually (5,000 ha, yields of 15m3 per ha per year and current fuelwood prices) in addition to its contribution to emissions reductions targets. The challenges to increasing the economic contribution of the sector include (a) institutional, (b) poor management of the LPA forests and (c) the scale of illegal forest activities.

2.2 Legislative Framework

26. The main legal document is the Forest Code (adopted in 1996 and amended several times since then). Other legislation adopted to ensure sustainable and rational use of forest resources are summarized in APPENDIX 2. The legal framework referring to forests or affecting forestry in some way is sometimes characterized by inconsistencies and overlapping between different regulations. This adds a layer of complexity and creates barriers to implementation or even understanding the institutional framework.

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[18] NOS 2013. Statistical annals of Republic of Moldova, National Office for Statistics.

[19] UNDP 2013. The Economic Value of Ecosystem Services in the Republic of Moldova. Report prepared under the UNDP-GEF project National Biodiversity Planning to Support Implementation of CBD 2011-2020 Strategic Plan in Republic of Moldova.

[20] WTC 2013. Travel and Tourism Impact 2013. Moldova Travel and Tourism Council, London.

27. There has been many changes since the adoption of the Forest Code including the international focus on sustainable forest management (SFM), forests contribution to climate change and the role of forests in providing environmental services and Moldova's intended accession to the EU, not all of which were foreseen in the drafting of the legislation. Planned changes, in particular institutional reforms within the sector which will see a separation of roles for the state, are not addressed within the current law.

28. The main policy document approved by parliament is the "Strategy for the sustainable development of the forestry sector of Moldova" and dates from 2001. The Governmental Decision Nr. 739 of 17.06.2003 provided a detailed action plan for the implementation of the strategy which was abrogated by Government in 2012. While a replacement action plan is under preparation, a revised strategy and associated action plan is now urgently needed.

29. Moldsilva implements the state policy through the technical regulatory framework. The forest normative framework is more or less applied in Moldsilva's forests, but less or almost not at all over the remainder of the forestlands (community, private and other types of forest vegetation).

30. To insure the preservation of national forest heritage and to reduce illegal logging and other associated forest crimes, Moldsilva in cooperation with the ENPI FLEG program implemented "The National Plan to Combat Illegal Logging and Other Forest Crimes for 2009-2011" (so called NAP FLEG) by the Moldsilva's Order No.11-p of 30.01.2009.

31. The forestry sector is actively participating in the implementation of the Strategy and Action Plan in the field of Biological Diversity Conservation in Moldova (2001), including in the updated strategy in accordance with Aichi targets for 2011-2020[21].

32. Table 5 summarizes EU legislation relevant to the Moldovan Forestry Sector

Table 5: EU Legislation Relevant to Forestry

EU Legislation with Relevance to Forest Sector
Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community
Directive 79/409/EEC on the conservation of wild birds
Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment
Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora
Directive 1999/105/EC on the marketing of forest reproductive material
Directive 2000/60/EC establishing a framework for Community action in the field of water policy
Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment
Directive 2004/35/EC on Environment Liability with Regard to the Prevention and Remedying of Environmental Damage.
Directive 2006/11/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community
Directive 2009/28/EC on the promotion of the use of energy from renewable sources
Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides

2.2.1 Legal Framework Challenges

33. Forest legislation needs to be amended to reflect the reality of increased interest towards forest resources in order to allow forest ecosystems perform their functions (environmental, social, and economic). The forestry sector has historically operated in isolation and decisions were almost invariably taken without the benefit of external participation, which reinforced the isolation and contributed to the underestimation of the forestry sector. The legal framework must support ecological principles to ensure the genetic stability of forest ecosystems and the sustainable development of forest resources. Furthermore, the framework should promote the necessary institutional reforms in terms of separation of economic from policy and regulatory

[21] The Aichi Biodiversity Targets are 20 ambitious goals that make up part of the Convention on Biological Diversity (CBD) Strategic Plan for Biodiversity 2011–2020, adopted in Nagoya, Japan, in 2010.

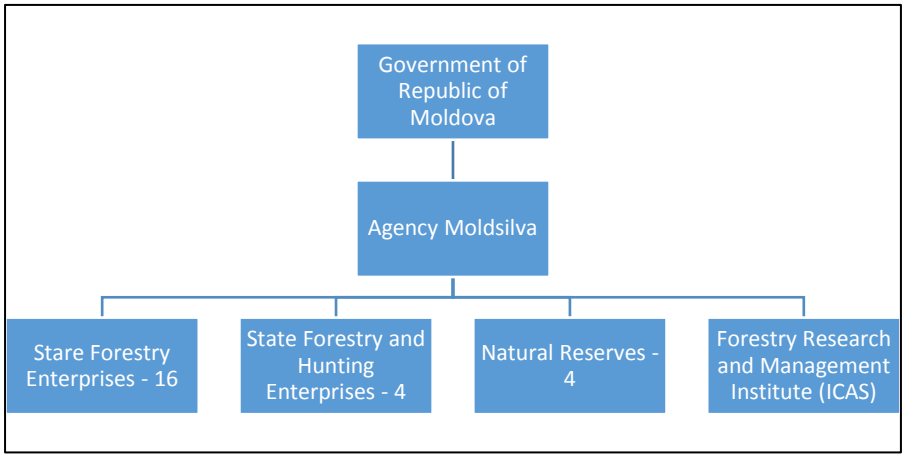
functions, community forestry development, as well as private sector participation in the sector and harmonizing it with the EU legislation.

34. Forestry authorities in cooperation with international bodies (EU, World Bank, IUCN, WWF, and UNDP) have already started improving the forestry legislation. The new Forest Code will be developed based on quantitative data from ENPI FLEG and regional/international analysis of similar legislation. A new Action Plan for ensuring the implementation of the strategy of sustainable development of the forestry sector is already under development through a consultation process with a wide variety of stakeholders under the ENPI East FLEG II Program.

2.2.2 Institutional Framework

35. Institutions and organizations involved in the forestry sector are the Ministry of Environment (MoE), State Ecological Inspectorate, Agency Moldsilva and its subordinate state entities, LPAs owning forests and other institutions owning minor forest vegetation (Ministry of Transport and Road Infrastructure etc.). The vision of the Environment Strategy 2014 - 2023 (adopted by the Governmental Decision nr. 301 on 24.04.2014) is to create a functional system (institutional, administrative, management) adjusted to EU policy and to ensure a sustainable environment. The overall institutional structure is shown in Figure 3.

Figure 3: Organizational structure of Moldsilva



36. According to GD no 847/2009, the MoE is responsible for regulating environmental protection and natural resources utilization (including forests). The MoE exercises the thematic control on the activity of the forest enterprises through the State Ecological Inspectorate. It also controls the activity of protected areas (PAs) management undertaken by natural reserves subordinated to Moldsilva. The Agency Moldsilva is the central public authority, subordinated to Government, with the main responsibility to implement state policy in forestry and hunting. Moldsilva is responsible for issuing the regulatory framework for forestry (in technical issues rather than environmental ones) and has direct financing from the Government independent from the MoE. It also has administrative functions and has 25 subdivisions encompassing 16 state enterprises for silviculture, 4 state enterprises for silviculture and hunting, 4 natural reserves, Orhei National Park and the Forest Research and Management Institute - ICAS There are 80 forest districts (FD) below the level of state enterprises

37. The State Ecological Inspectorate with branches in each district, all subordinated to the MoE, has an important role regarding forestry issues in controlling law and forest region enforcement, issuing authorization for forest management plan (FMP) implementation, and for harvesting.

38. Many LPAs are also community forest owners with almost 100,000 ha of forest and protection belts. According to article 9 (and partially other articles) of the Forest Code, LPAs have certain obligations regarding forest management, such as organizing and coordinating usage, guarding, regeneration and protection of forest vegetation administered by themselves. There is no clear description of the roles of LPAs and Moldsilva with regard to community forests as long as the regulatory framework continues to state that they have to cooperate towards the maintenance of community forest vegetation without clearly describing the scope or protocol for such cooperation; such a mechanism should be a part of a separate regulation.

39. Many communal lands afforested during 2002-2010, have not yet been returned by Moldsilva to the LPAs. Some LPA owners do not want to take back their forests while others lack the resources to ensure their guarding after their return. This could be resolved through the initiative to assist recently established forest owners build agreements with state forestry enterprises to undertake FMP and guarding and associated activities (almost 30% of the area agreements between Moldsilva and the LPAs have been signed). Alternatively by enhancing institutional capacity of LPAs to undertake guarding (institutionalizing forest staff, or other staff with responsibilities for forestry), also including training of such staff (which is already being done by ICAS through a National Forestry Consultative Office).

2.2.3 Forestry Institutional Reform Strategy

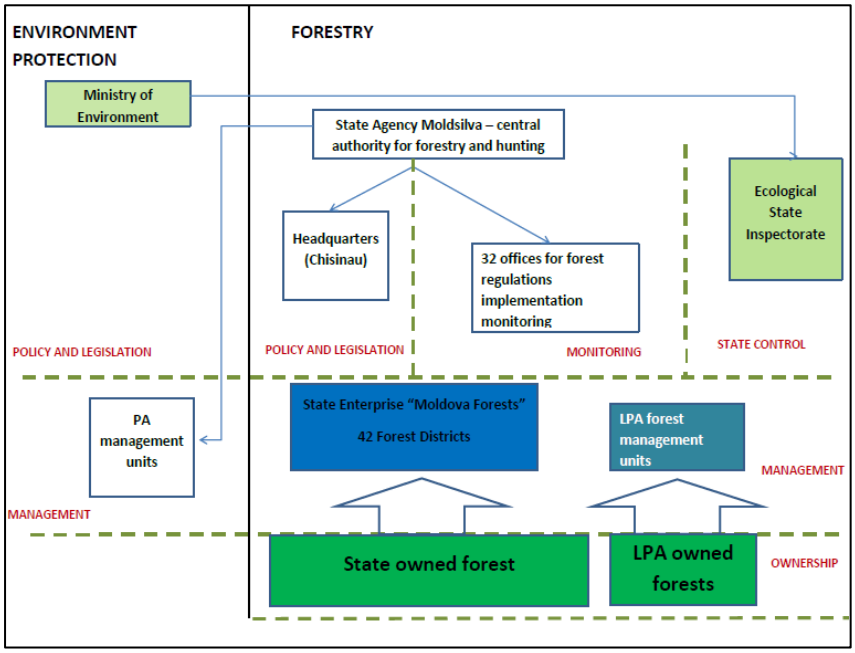
40. The political developments in Moldova are oriented towards institutional reforms at all levels of the central administration, as outlined in the *Reform Strategy of Central Public Administration* (GD 1402/2005) and in the Government activity program *"European Integration: Liberty, Democracy, Welfare"*[22]. In this recent context, the Government emphasizes the importance of restructuring the forestry sector according to the *Strategy of Sustainable Development of the National Forestry Sector* (GD 739/2003).

41. The World Bank (WB) analysis confirms the general need to develop a national Strategy for Institutional Reform of the Forestry Sector in Moldova (FIRSM) as well as the need for a consensus to be reached among the main players in nature/forest resources use and conservation. The need for a clear separation of the regulatory and administrative roles of various institutions involved in forestry, the need for more transparent, effective and efficient administration of both state and communal or/and private forests as well as an increasing involvement of the private sector in forest resources use and conservation are the main reasons for the adoption of a comprehensive strategy for institutional reform of the sector.

42. The FIRSM was prepared through a participative process in 2012 with the assistance of the WB and the ENPI FLEG 1 Program (Box 1 presents a summary of the ENPI East FLEG Program Phases I and II). The synthesis of the SWOT analysis undertaken as part of the process is provided in Appendix 1. Following a period of public consultation, the strategy is currently under internal review within Moldsilva and a new period for consultation is envisaged to begin shortly. The main objectives of the FIRSM as formulated by the participants in the process are: i) Separation of regulatory, management and control functions within forestry, ii) Strengthening the regulating and monitoring capacity of the central authority for forestry and implementation of a unitary policy for forest development and conservation, iii) Efficiency of public forest management, based on sustainable management of forests, iv) Sustainable management of non-state forests, v) Adapting forestry products and services to the market economy and creation of an optimal framework for business environment to be involved in specific forestry sector activities, vi) Strengthening the professional capacity of the foresters through education, permanent training and career management system. Several government agencies and line ministries have already expressed their support for the proposed reform. The overall structure proposed by FIRSM is shown diagrammatically in Figure 4.

[22] http://gov.md/doc.php?l=ro&idc=445&id=6413

Figure 4: Separation of management, regulatory and control functions in FIRSM[23]

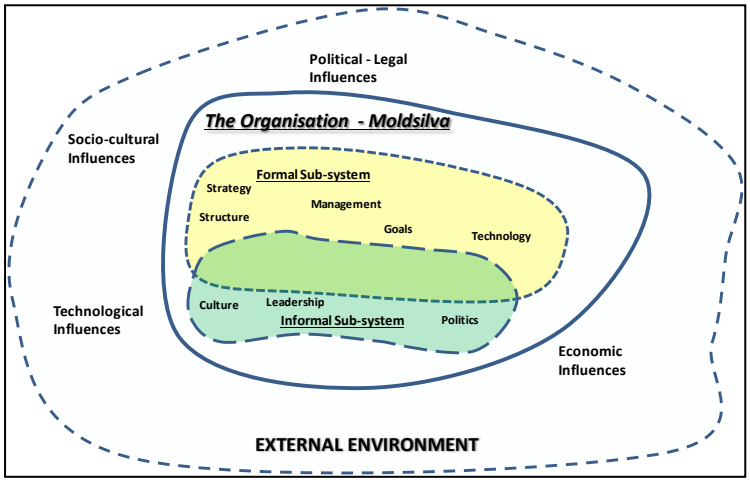


43. The preparation of FIRSM was based upon a number of underlying principles formulated and agreed at the start of the process (Appendix 1). The entire process of FIRSM design (through sub-sectoral working groups and subsequently integration by a sector group) highlighted a series of weaknesses in addition to the overlapping of functions: uneven spread of forest resources, low traceability of wood, poorly identifiable profit/cost centers, lack of technical support for LPAs that own forests, etc. However the FIRSM also identified some opportunities that will be captured in the event of reform: i) increasing demand for forest resources, ii) increasing interest of private sector in sustainable forest management, iii) carbon market, iv) increasing interest for biodiversity conservation in connection with eco-tourism, v) EU accession in terms of common strategy and transfer of best practices. By investing in Moldsilva's current human resources and already developed capacity for afforestation (including improvements in nurseries) the reformed sector will be well positioned to cope with the new political and natural (i.e. climate change) operating environments.

44. Moldsilva dominates the forestry sector. It is the largest forest owner, the dominant supplier of firewood and logs, the main employer and the main user of contracting services within the forest sector. It is important that as an organization it is able to deliver upon the range of services that society now requires. To do this Moldsilva will need not merely to rearrange the functional units within its structure but also to undertake a more fundamental reform focusing on good governance, the implementation of strong robust budgeting and financial systems, more transparent business processes and identifying and developing efficiencies throughout the organization. Only in this way will the organization approach becoming sustainable and delivering on its remit from government and society and only in this way will forests be able to deliver on the range of environmental services and non-timber benefits. This will require investment in resources as for example in IT, forest management information systems, staff training and in nurseries if the planned afforestation program and the development of more stable forest ecosystems is to be achieved.

[23] Moldsilva retains only the regulation and policy function along with a stronger monitoring and technical controlling capacity (the offices in the territory for monitoring and extension services). This territorial extension of the central authority is intended to have an important role in supporting the LPAs in developing structures for forest administration and has a different role than the Ecological Inspectorate that is focusing mainly on biodiversity conservation rather than the quality of forest works and manner of implementing the forest management plan (FMP). The FIRSM provisioned that the forest management planning capacity and research capacity be retained as an independent state owned enterprise under the coordination of Moldsilva, but as a separate profit centre.)

Figure 5: Operating Environments - Moldsilva



45. Organizations including Moldsilva operate in at least three different types of environment. The first is the temporal environment which consists of the historical developments bringing changes over time. It is instrumental in helping to understand / explain an organization's 'idiosyncrasies' of strategy, and structure, culture, politics and leadership style. The second type of environment is the external environment which includes socio-economic factors, the general economy of the country, political and legal influences and for Moldova you can include EU accession. The third is the internal environment. Within this internal environment there are typically two sub-systems. The first is the formal which can be described as the "official" way the organization functions. The second is the informal sub-system which in simple terms can best be defined as "the way we do business around here". This reflects the culture, the local and organizational politics, the style of leadership and the motivation of staff. The key task for any organization is to manage these environments. Simply changing the organizational structure will not necessarily improve efficiency of operations or the quality of the service(s) being provided if the sub-culture is opposed to change or to implement new operating procedures. Simply put, Moldsilva will need to change the way it does business.

Box 1 Description of The EU Funded ENPI East FLEG Program Phases I and II

ENPI FLEG I (2009-2012)

Objective: To put in place improved forest governance arrangements through the effective implementation of the St. Petersburg Ministerial Declaration with the support of selected pilot activities and with the involvement of participating countries governments, private sector and civil society.

Local stakeholders (Moldsilva in cooperation with other governmental bodies, NGOs and local governments) developed a National Action Plan which was implemented in cooperation with ENPI FLEG regional program.

Main activities focused on:

- Strengthening forestry institutional capacities;
- Support for the updating of forestry laws and regulations, harmonizing them with the environmental protection and natural resources legislation, and with the corresponding obligations under various international agreements;
- Strengthening of forestry law enforcement by improving coordination between central and local (forest, environmental protection, police, customs and judicial authorities, etc.);
- Creating conditions for the establishment of a fair market for forest products and services;
- Addressing timber from illegal sources in the economy;
- Involvement of civil society in the management of forests and to ensure transparency of decision making in the sector; and
- Development and implementation of anti-corruption instruments.

ENPI FLEG II (2013-2016)

Objective: to strengthen forest governance through improving implementation of relevant international processes (e.g. the St Petersburg Declaration, FORESTS EUROPE), enhancing their forest policy, legislation and institutional arrangements, and developing, testing and evaluating sustainable forest management models at the local level on a pilot basis for future replication.

National priority areas were identified in cooperation with local stakeholders and are:

- Promoting good governance of forestlands managed by other than governmental entities through building capacities for rational management of local natural resources;
- Piloting an inter-communal forest entity (ICFE) to enhance economic activities and involvement of local population in forestry activities;
- Conducting an analytical study on forest ecosystem services (ES);
- Developing a monitoring system of wood flows and supporting law enforcement agencies to ensure the elimination of illegal activities;
- Optimizing forest legislation by examining international experience and harmonizing with EU requirements;
- Strengthening local capacities of a pilot-nursery and promote energy forestry;
- Reducing forest illegalities through increased public awareness; and
- Enhancing educational and institutional capacities to create young school messengers for Moldova's forests.
- Priority areas are in line with regional and international developments and build on lessons learned elsewhere. Some activities will be locally based and tested in order to trigger development mechanisms at local level (e.g. improving nursery governance, demonstration plots on how to establish energy plantations, undertaking FMP in selected LPAs, promoting community and private forestry at local level).
- The processes of revising forest policy institutional reform (FIRSM) will be supported through various activities. The challenges of the forestry sector will be further addressed and promoted at governmental level (Parliamentary commissions, Ministries) and throughout decision-making and executive bodies at local level (local public authorities, district administrations, civil society).

The FLEG program is funded by the EU and implemented by the World Bank in partnership with the international NGOs IUCN and WWF.

2.3 Forest Monitoring / Research

2.3.1 National Forest Inventory

46. Accurate, up-to-date information about the size, distribution, composition and condition of forests is essential for developing and monitoring policies and guidance to support their sustainable management and to fulfil national and international reporting commitments.

47. The purpose of a national forest inventory (NFI) is to record and assess the extent and nature of a country's forests, both public and private, in a timely, accurate and reproducible manner to enable the sustainable development of the forest resource. Data from NFIs are used to estimate carbon stocks through the calculation of forest biomass figures and GHG emissions associated with land-use change. More recently NFIs have been initiated in response to demands for multi-resource information about forests from international and national bodies such as the Food and Agricultural Organization/Economic Commission for Europe (FAO/ECE). A statistically based NFI can be very helpful besides the regular detailed forest management plans.

48. Moldova does not have a NFI and relies on the amalgamation of (i) FMPs that provide data on national forest resources, (ii) properties book according to Agency for Cadaster and Land Relations, and (iii) GD 1007/1997 on keeping the state evidence of forest land. However not all forests are subject to FMPs. Furthermore, the scope of data collected falls short of many of the requirements for reporting at an international level, especially so if Moldova continues with its policy of EU accession. An accurate assessment of the current status of Moldova's forest resource is now required to establish a baseline against which the performance of any planned institutional reform can be monitored.

49. A combination of an NFI and a complete implementation of the current legislative provisions regarding land registration would afford Moldova policy makers a more informed view of the resource and its status and would facilitate national reporting against international reporting commitments both now and into the future. A NFI would also provide reliable information on the extent of deforestation, illegal logging and on the health and status of Moldovan forests.

50. To respond to the needs for harmonized European information, representatives of the European NFIs established an informal network - the European National Forest Inventory Network (ENFIN) in 2003. One of the activities of ENFIN is to improve and harmonize the existing national forest resource inventories across Europe, to support new inventories and to promote the use of scientifically sound and validated methods in forest inventory designs, data collection and analysis.

51. Membership of ENFIN is not limited to EU Member States and membership could bring many advantages to Moldova not only in terms of networking but also in terms of the design and implementation of a NFI should Moldova decide to undertake one.

2.3.2 Forest Research, Development and Technology

52. The Academy of Sciences of Moldova (ASM) is the highest scientific forum within the country and represents the only public institution of national interest in the sphere of science and innovation. Forest research is mainly undertaken by the institutes within the Academy, based on their specialization: The Botanical Garden (Institute) – aspects regarding botany, dendrology, The Institute of Zoology – aspects regarding zoology, Institute of Ecology and Geography – ecology, climatic factors, etc. Forest research is also undertaken within the Institute for Forest Research and Management Planning (ICAS) or in the scientific sections of the Natural Reserve administrations within Moldsilva.

53. There are many examples of innovative forest research being undertaken. However, research is relatively short term in nature partly due to limited budgets and funding. Moldova does not have a national forest research program and national coordination of forest research is lacking. The absence of a national forest research program, low involvement of the forestry public authority in establishing research priorities but also the fact that the results are not disseminated to the forestry state authority limits the effectiveness of the forestry research.

54. The development of a strategic research agenda (SRA) approach for the forestry sector would provide direction and prioritize research both in the short and medium term thereby enabling a more efficient and coordinated use of scarce resources.

55. The immediate need is to address the potential impact of climate change and this could be supported through research on species resistance, forest resilience, and provenance trials. Other important areas include

the afforestation of degraded lands and biological disease control agents and the most appropriate species and cultivation methods for fast growing energy crops as well as other research directions. An important need is the inventory and mapping of biodiversity in order to develop PAs management plans for streamlining the conservation efforts and to reduce the tendency for over-regulating the use of forest resources. The applied research in terms of GIS usage both for forest and PAs management purposes is also an area of interest. All the research undertaken should have an integrated approach, bringing together in a landscape view foresters, agronomists, hydrology experts, etc. Finally adopting an SRA approach would bring together the various stakeholders and facilitate closer collaboration and enable a more holistic approach to forest research.

56. There are also needs for research in other areas as for example evaluation and conservation of forest genetic resources, forest pathology, game species inventories, uncontrolled breeding for game species, carrying capacities in term of game species, etc.

57. There are many innovations and applications developed for other sectors that can be readily used for forestry research and management. These new technologies are not yet used in Moldova. The transfer of knowledge and technology implies qualified personnel in specialized fields and the need for improved capacity within the forest sector including forest research.

2.4 Forest Management

58. Moldsilva manages 82.9% of the NFF[24]. Other state institutions (central authority for waters, Botanical Garden, etc.) manage up to 3.8% of the NFF. The LPAs forests are officially managed by the LPA's but there is "*de facto*" management for some 20% of the LPAs forests. About 20,000 ha of the LPA's forests are guarded by Moldsilva's units, due to their involvement in the carbon sequestration afforestation projects. These areas will revert to the LPA's as soon as the carbon projects activities end.

59. All forests managed by Moldsilva have 10 year FMPs elaborated by ICAS. The current management planning approach was introduced in the 1990's, using the Romanian model for forest management planning. FMPs are approved by Moldsilva and any changes in the FMPs are obliged to be thoroughly substantiated and undergo intricate and bureaucratic procedure before being accepted. Forest management planning is based on five major principles: i) continuity of forest functions, ii) optimal and sustainable exercise of multiple production and protection functions of the forest, iii) optimal and sustainable utilization of forest, iv) principle of aesthetics, and v) biodiversity conservation[25].

60. Most of the forest owned by LPAs do not have FMPs. In 2010 and 2013 attempts to have FMPs for these forests were undertaken utilizing funds from Japanese Grant and ENPI-FLEG, but to the end of 2013 only some 16,000 ha has been completed. More community and/or private lands (about 3,000 ha) will be subject to FMP in the next few years (e.g. through ENPI FLEG II Program, Clima EAST).

61. In the absence of FMPs and arrangements for their active management, guarding and protection, it is difficult to see how the LPA forests can survive without becoming degraded and over-exploited. Their future sustainable management will depend on a combination of improving the forest management institutional framework and forest management planning. Considering the significant anthropic pressure on these forests, their future management should be prioritized to halt their ongoing degradation.

2.4.1 Wood Production

62. The total growing stock is estimated as being 46 million m^3 representing an average of 124 m^3/stocked ha. The average age of the forest is 40 years but the age class distribution is uneven[4] being skewed towards the younger age classes as a result of previous management / exploitation practices and the fact that more than 60% of stands are of coppice origin. Total annual increment is estimated at 1,252,000 m^3 (or 3.3 m^3/stocked ha). In addition, the annual increment of the forest outside the NFF is estimated at 110,000 m^3. The annual allowable cut (AAC) in the forests administrated by Moldsilva is approximately 32% of the annual increment compared with a European average of 57.8% for 2010[26]. The official annual harvested volumes are in line with the AAC.

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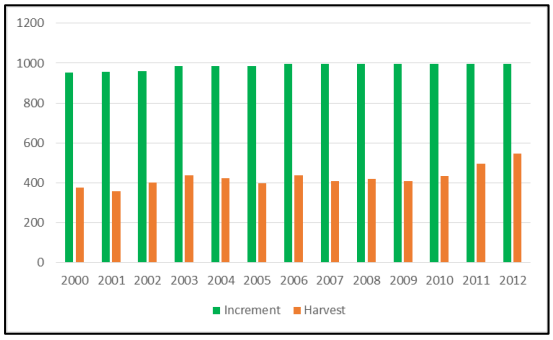
[24] There is also some forest vegetation outside the NFF, mainly shelterbelts or other type of forest vegetation (trees, shrubs).

[25] Leahu, I., 2001, Amenajarea Padurilor. Editura Didactica si Pedagogica, Bucuresti. 616 p.

[26] State of Europe's Forests 2011. Report jointly prepared by FOREST EUROPE Liaison Unit Oslo, the United Nations Economic Commission for Europe (UNECE) and the Food and Agriculture Organization of the United Nations (FAO).

Figure 6: Annual increment and harvest volumes (Forests administrated by Moldsilva)[27] ('000m³)



63. Up to 2009, harvesting activities were carried out solely by the Forestry State Enterprises subordinated to Moldsilva. Starting in 2010 part of the volumes to be harvested were sold by public auction organised by Moldsilva. During 2010, 112,000 m^3 were sold through auctions to private harvesting companies, in 2011, 101,100 m^3 and in 2012 this reduced to 47,000 m^3 (www.moldsilva.gov.md). The majority of the stands offered at auction comprised acacia (black locust) suitable only for firewood. The remainder of stands are retained by Moldsilva for its SFEs which hire local population (including seasonal personnel working with SFEs staff) for their harvesting. The decrease in volume in 2012 was due to a combination of (a) the absence of appropriate and implemented regulations regarding the technical competence and ownership of companies participating in the auctions that facilitated the conflict of interest whereby companies controlled by Moldsilva employees were awarded with harvesting contracts, (b) a weak and undeveloped SME sector and (c) concerns regarding previous abuse of the auction system.

64. Timber and firewood prices are set centrally by Moldsilva and a pricelist issued to the SFEs with prices per m^3 varying depending on species, quality and assortment category. The SFEs have limited flexibility to deviate from this pricelist. They are however responsible for their own costs which in turn will determine the profit margin if any on their timber sales. The average pricelist for firewood was 427 MDL per m^3 ($27) in 2013. Timber for processing can be transferred between units within the same SFE and in this instance the transfer pricing does not always reflect the market price.

65. Between 2006 and 2010 timber represented an average of only 10.3% of harvested wood volume, the balance being firewood[28]. This timber was mainly processed by the state enterprises under the umbrella of Moldsilva. Between 2006 and 2010 Moldsilva processed 28,000 m^3 annually or 7% of the total harvested wood volume with the balance processed by private entities. The annual processing capacity in Moldsilva is circa 100,000 m^3, but is severely underutilized due to scarcity of supply[8]. The outdated and obsolete processing technology results in low productivity, low recovery rates and reduced competitiveness. During the soviet era, timber processing was reliant on imports of logs mainly from Ukraine. The introduction of standing volume auctions reduced the quantities processed by Moldsilva while the private sector has begun to develop, albeit at a slow pace.

2.4.2 SME Sector

66. The forestry sector is still organized on the basis of centralized planning and decision making. All forest activities are cumulated into the SFEs that are subordinated to Moldsilva: forest management planning, forest administration, nurseries, afforestation, harvesting, and wood processing. The expenditures and revenues of these activities are recorded at the level of the SFE. An accurate analysis of the economic efficiency of certain activities is extremely difficult. For example, the processing units within certain SFEs receive wood from other units in the same enterprise based on decisions that are not correlated with the market demands (especially the prices) in an attempt to maintain those processing units above the margin curve. Under such a scenario, the private forestry companies have little chance to be established and / or developed.

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[27] Moldsilva, 2013. Informative materials regarding Moldsilva Agency activity. Qualitative and Quantitative indicators of the forest fund.

[28] Botnari F., Galupa D., Platon I. et al. (2011): State of the Forestry of the Republic of Moldova 2006-2010. Agency Moldsilva. Chisinau. – 60 pp. Report prepared under the ENPI FLEG Program

67. The only area where some opening for the private sector is manifesting itself is in harvesting under the timber auction system. There are some dis-functionalities that have prevented this initiative from having any real impact in supporting private sector development including (a) small quantities that are offered at auction, (b) low predictability in terms of future auctions and (c) conflict of interest arising from the absence of appropriate and implemented regulations regarding the technical and ownership of the companies participating in the auctions. It is worth noting that the scale of activities undertaken by Moldsilva in terms not only of harvesting but also planting is relatively small and would favor locally based SMEs in contrast to larger forest companies.

68. During the FIRSM process a number of possible actions to stimulate SMEs were explored including: (a) Separating the volume estimation from the harvesting activity by gradually increasing gradually the quantities of wood for auction with increased predictability in terms of quantities auctioned annually; (b) Better regulate the participation of companies in the auction process in order to combat the conflict of interest and; (c) Create cost/profit units coordinated by only one forest enterprise that make separate financial statements in order to be able to assess the efficiency of certain forestry related activities and; Privatize facilities and activities that prove to be inefficient.

69. The FIRSM process also considered afforestation activities that in many cases are undertaken by members of local community that are not actually paid for their work legally but rewarded with fire wood from the cuttings done by the forest rangers that are often undervalued on paper in terms of volume estimation. By eliminating this practice there is an opportunity for real SMEs to provide afforestation services, mainly in the poverty affected areas in the rural Moldova.

2.4.3 Illegal Logging

70. Illegal logging is a global problem with significant negative economic, environmental and social impacts[29]. In economic terms illegal logging results in lost revenues and reduced productive capacity; in environmental terms it is associated with deforestation, forest degradation and a loss of biodiversity and in social terms it can be linked to conflicts over land and resources, the disempowerment of local and indigenous communities and corruption. Illegal activities also undermine the efforts of responsible operators by making available cheaper but illegal timber and timber products in the market place.

71. The first regional Ministerial Conference on Forest Law Enforcement and Governance (FLEG) took place in the East Asia and Pacific region in September 2001 in Bali, Indonesia. Subsequently, a ministerial process was instigated in Africa (Ministerial Conference, October 2003, Yaoundé, Cameroon) and Europe and North Asia (Ministerial Conference, St. Petersburg, Russia, November 2005). Moldova participated in the 2005 conference whose main focus was strengthening of forest legislation enforcement and governance for Europe and North Asia countries (ENA FLEG). Together with 43 other countries, Moldova signed an agreement, committing to developing a National Action Plan to combat illegal activities in the forestry sector. The Plan was approved by Moldsilva in 2009 and included the establishment and strengthening of some institutional capacity and mechanisms aimed at fighting the illegal trade in wood products and implementing anticorruption and sustainable forest management tools. Under the Stability Pact for South-Eastern Europe, Moldova signed the Memorandum of Understanding concerning cooperation in fighting corruption.

72. As a parallel process to the development of a Moldovan National Action Plan relating to forest resources, the ENPI FLEG Program was established to improve governance structures and to strengthen sustainable forest management practices. The Program focuses on (a) forest law enforcement and governance (FLEG) training (geographic information systems, digital forest mapping, database usage) for forestry staff (governmental, community level, private), local authorities, judiciary bodies and customs officers, (b) capacity building for forest management planning at community level, (c) legislative analysis with the aim of improving forest legislation, (d) analytical studies (wood consumption, illegal logging) and socio-economic impact of inefficient forest management practices on local communities and (e) information and communication campaigns with key audiences (government, local communities, private sector, NGOs).

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[29] Commission Staff Working Document *Accompanying the document* Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A new EU Forest Strategy: for forests and the forest-based sector {COM(2013) 659 final}, {SWD(2013) 343 final}

73. Under authorization from the Ministry of Environment, Moldsilva harvests circa 400,000m^3 annually. There is some scope to increase the AAC but this is likely to meet with opposition from environmental NGOs. The official estimates of illegal logging are presented in Table 6.

Table 6: Illegal Logging 2010 and First Half 2011[30]

			2010	2011	2010	2011
Land Owner	**Total Area '000ha**	**Inspected Area '000 ha**	**Illegal Logging (m3)**	**Illegal Logging (m3)**	**m3/'000 ha Inspected**	**m3/'000 ha Inspected**
Agency Moldsilva	336.6	302.4	3,869	2,562	12.8	8.5
LPAs	75.0	72.8	16,410	12,537	225.4	172.2
Total / Mean	**411.6**	**375.2**	**20,279**	**15,099**	**54.0**	**40.2**

74. According to the analysis of illegal logging conducted under the ENPI FLEG, the officially reported volumes of illegal harvesting are relatively small with the greater proportion occurring in forests outside of Moldsilva. However, the report on wood consumption estimates the annual use of fuelwood at 1.039 million m^3 or almost three times the reported sale of firewood (Table 7). The total estimated consumption of fuelwood and timber used for energy is 1.079 million m^3 and this represents 80% of the estimated annual increment of forests and other forest vegetation.

Table 7: Estimated annual consumption of biomass for energy[31] *(m^3)*

Zone	Number of Households	Fuelwood	Timber	Non Woody Sources	Total Consumption
North	345,747	200,533	10,372	44,947	255,853
Centre	533,207	506,547	15,996	154,630	677,173
South	202,544	332,172	14,178	123,552	469,902
Total	**1,081,498**	**1,039,252**	**40,547**	**323,129**	**1,402,928**
% of Total Consumption		**74.1**	**2.9**	**23.0**	**100.0**

75. It is difficult to estimate the gross value of the illegally harvested timber. However assuming that the greater proportion is fuelwood and using average 2013 prices and allowing for legal harvesting in LPA and other forests, the value is conservatively estimated as being between 15 million to 17 million USD.

76. While there can be a number of contributory factors to the imbalance between estimated consumption and official wood supply, the scale of the imbalance indicates that there are significant volumes of illegal harvesting. The most frequent types of illegal logging are (a) logging without legal documentation for energy purposes and/or logging for other purposes on land managed by LPAs and the MTRI, (b) commercially driven logging, performed illegally in forests and other lands covered with forest vegetation regardless of the ownership type, (c) manipulation of wood volumes while conducting forest site inventory (revision) by not including such volumes in the legal documentation and, ultimately, creating corruptive schemes and bribing the personnel involved in such activities.

77. The main driver is not commercial gain, rather it is welfare/poverty alleviation with households unable to pay for legally harvested fuelwood or alternatives to fuelwood for heating and cooking. However commercially driven selective illegal logging of valuable species e.g. oak and cherry cannot be discounted. Corruption across the sector facilitates both poverty driven and profit driven illegal harvesting.

78. The balance between annual increment and harvesting (felling) is internationally recognized as the first criterion for assessing the sustainability of forests. The relation between increment and felling is decisive for the current and future availability of wood and for shaping a stable growing stock. Felling should not exceed increment in the long run. Indeed due to the protective and protected nature of many forests felling should be significantly lower than increment. Based on ENPI FLEG survey results, the current level of removals (legal plus illegal) from forests is unsustainable and will, if let run uncorrected, result in not only reduced forest capacity to provide timber and fuelwood but also a reduction in biodiversity and increases in deforestation / degraded forests which in turn will lead to further land degradation and erosion.

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[30] (Galupa, D. et al 2012) Illegal logging in Moldova: Analytical Study 2010-2011. Report prepared under the ENPI FLEG

[31] Moldovan Forests - Wood Harvesting and Consumption, May 2011. Report prepared under the ENPI FLEG

79. A number of actions have been undertaken in recent years geared towards reducing forestry-related contraventions and offences. Joint plans by forest authorities have been developed and implemented with a view to ensuring public security and environmental protection in the fight against illegal logging. However these have not as yet proved sufficient. The introduction of improved and more robust monitoring and recording systems along the supply chain could form part of the answer and help reduce opportunities for manipulation of volumes and corruption. Improved recording and accountability could also help identify sources of illegal wood including imports. A more integrated approach with active cooperation with law enforcement authorities, courts, the local population and public authorities is required.

80. There is a logic to increasing the AAC more in line with European norms. However such a move is likely to meet with resistance from environmental NGOs. It would however officialize part of the volume that is now classed as illegal harvesting and potentially reduce the wood flow to the "shadow" market. However to do so in the absence of improved and more robust recording and monitoring systems could increase the opportunities for illegal activities.

2.4.4 Wood Energy

81. Wood is a natural, renewable, reusable and recyclable raw material. If it is sourced from sustainably-managed forests, is processed and used to minimize negative effects on climate and the environment while providing livelihoods, its role can be sustainable. Within the EU some 42% of harvested wood biomass is used for energy, accounting for about 5% of total EU energy consumption.

82. Table 7 shows the summary results from a comprehensive wood consumption survey conducted under the ENPI FLEG program, which included more than 750 interviews with respondents. This survey indicated that wood is primarily used by the local population as an energy source. Its annual consumption was estimated as being 1,039,252 m^3 or 74% of all wood and non-woody biomass consumed domestically. Some 81% of respondents used wood as their primary source of energy, mainly for heating while 17% also used wood for cooking.

83. The ENPI FLEG survey showed that some 28% of respondents claimed to use up to 5 m^3 of wood during the heating season, 33% used from 5 up to 10 m^3 and 7% used more than 10 m^3 while 13% were unable to specify the volumes of wood consumed annually.

84. According to official statistical data, the contribution of the forestry sector to the energy sector balance is low (3.3% of the total consumption of energy resources, and 12.3% of the consumption of domestic energy resources), but based on the survey results the population uses a much higher volume of wood resources.

85. Woody biomass use for heating contributes to improving the energy security of Moldova, as well as reducing the country's GHG emissions. However the greater part of the demand for wood energy is being met by illegally harvested material. This is unsustainable in the medium to long term. Alternative sources of legally harvested fuelwood / woody biomass need to be identified if the forest resource is to be managed on a sustainable basis.

86. Moldova's third national communication to the United National Framework Convention on Climate Change (UNFCCC), as part of its adaptation measures to reduce losses/risks in the biomass energy sector, advocates (a) the introduction of new crops with higher heat and water stress tolerance, (b) substitute fuel sources and (c) support for emergency harvesting of biomass.

87. Short rotation high yielding forest energy crops offer potential and are in line with the approach advocated under the UNFCCC. A national wood energy program with a target afforestation area using high yielding species suited to the forecast impacts of climate change could dramatically increase the supply of legally sourced fuelwood in a relatively short space of time while at the same time alleviate pressure on existing forest resources from illegal harvesting.

88. The planting of short rotation forestry (SRF) could pose a number of potential threats and benefits to water quality and quantity. Potential threats to water quality would mainly arise from harvesting operations, which can be controlled by good practice. SRF is expected to significantly improve water quality compared to arable cropping and while conversion of only limited areas of more intensively farmed land may be appropriate, there are believed to be major opportunities for targeted planting of SRF to mitigate potential

pollutant sources and interrupt delivery pathways to watercourses[32]. Thus judicious planting of SRF could help tackle the major diffuse nutrient and sediment pollution pressures associated with agriculture and urban activities.

2.4.5 Hunting and Game Management

89. MoE is responsible for policy while Moldsilva is the central authority for forest and hunting/game management. Moldsilva manages 336,000 ha of hunting areas, located in the state owned forests. The Society of Hunters and Fishermen of Moldova (SHFM) manages, based on a land lease form of management, more than 2.6 million ha (mostly from LPAs and/or private landowners) with the objective of proper and sustainable game management and hunting activity for local citizens and foreign hunters. There is poor coordination between Moldsilva and SHFM as well as with MoE. Due to the large areas of land and/or forest properties suitable for hunting, the relationships among the main players can be difficult and there is a lack of coordination and management. The draft of the Law on hunting fund and game protection is currently under review. Upon the direction of the Parliamentary Commission of Environment and Climate Change, a long process of consultation has been conducted with the main stakeholders (MoE, Moldsilva, SHFM, Academy of Sciences, others) in the recent years. The dynamics of the main game species on Moldsilva managed lands is shown in Table 8.

90. The hunting/game management within Moldsilva's entities can be improved (both economically and ecologically) and a more balanced approach is required to reach sustainability. This will require closer collaboration between the main stakeholders and a more professional and pro-active approach to the management of the game resources.

Table 8: Dynamics of main game species on lands managed by Moldsilva

	Year										
Game Species	**1997**	**1999**	**2001**	**2003**	**2005**	**2007**	**2009**	**2010**	**2011**	**2012**	**2013**
Red / Sika Deer	385	416	436	500	578	530	486	506	375	406	431
Roe Deer	2,801	3,664	3,384	4,200	4,200	4,008	3,404	3,665	4,086	4,460	4,844
Wild Boar	1,282	2,691	2,110	2,600	1,700	1,768	2,086	2,054	1,850	1,713	1,731

2.4.6 Non Wood Products

91. Non-timber forest products (NTFPs) are generally defined as any biological resources found in woodlands except timber. Harvesting of NTFPs (fruits, berries, herbs etc.) is an important activity undertaken by entities within Agency Moldsilva. Volumes of NTFPs harvested vary depending on environmental factors and market requirements. Revenue from the sale of NTFPs helps reduce dependence on timber and firewood sales and broadens the overall revenue base of Moldsilva. NTFP production by year is shown in Table 9.

Table 9: Non Timber Forest Products - Moldsilva[33]

		Year				
NTFP Category	**Unit**	**2006**	**2007**	**2008**	**2009**	**2010**
Fruits and Berries	tons	302.8	533.3	696.8	331.5	360.8
Medicinal Herbs	tons	118.1	148.3	149.5	66.5	45.2
Agricultural & Livestock Products	tons	656.3	346.4	900.3	534.6	695.6
Honey	tons	5.6	5.9	4.2	5.8	5.2
Snails	tons	60.6	53.6	57.8	44.1	23.7
Fish	tons	1.3	2.2	5.1	0.2	-
Christmas Trees	thousands	18.3	16.6	6.6	4.9	13.9
Saplings - Fruit Trees	thousands	16.7	11.3	-	1.6	-
Saplings - Decorative	thousands	24.3	0.4	0.1	0.4	-
Saplings - Rose	thousands	0.9	3.0	0.2	-	-

[32] McKay, H. (ed.) (2011) Short Rotation Forestry: review of growth and environmental impacts. Forest Research Monograph, 2, Forest Research, Surrey, 212pp

[33] Botnari F., Galupa D., Platon I. et al. (2011): State of the Forestry of the Republic of Moldova 2006-2010. Agency Moldsilva. Chisinau. – 60 pp. Report prepared under the ENPI FLEG Program.

92. While the harvesting and marketing of NTFPs has the potential for expansion and for increasing the level of added value, it will require market research and investments in technology, the development of more efficient supply chains and improving the skills of personnel involved.

93. An important and as yet untapped potential of the forests in Moldova is their recreation function. In the absence of attractive tourist places, the increasing tendency and demand of the population is to spend their leisure time in some forested areas. The potential of ecotourism market is estimated [34] at $7.9 million per year (direct and indirect expenditures, including $2.4 million public investment, $1.4 million capital investment in excess as well as 1400 full time equivalent jobs[35]. The better the forest ecosystems are managed the bigger the increase in number of visitors and the bigger the contribution to local economy.

94. This untapped value of the forest could be considered as the foundation for future payment mechanisms for ecosystem services. This will also help protect forests from visitors dumping their refuse, especially during holiday periods.

2.5 Information Communication Technology

95. In the sector although many data are collected there is no integrated information system to assure the flow of information between the different activities: management, scientific research, production, education, governance.

96. The WB *Information and Communication Technology (ICT) for Forest Law Enforcement and Governance* project aimed to examine the essential question of how modern ICTs could improve the quality, professionalism, and effectiveness of forest governance in Moldova and Lao PDR. ICAS was the counterpart organization in Moldova. The project showed that, while ICTs offer undeniable benefits for forest governance, challenges remain for making the maximum use of technology because of the technical capacity of beneficiary organizations.

97. The project found that Moldsilva had relatively low initial capacity and the applications developed dealt with internal information management rather than engaging with the wider public. The project concluded that a gradual, stepwise approach to e-development is feasible or even preferable compared to large-scale sudden changes. However, much of the ICT use is about communication and engaging with diverse stakeholders also outside the forest agencies. Technological development has introduced a large number of innovative solutions that can be used by forest agencies to deal with their clients and partners. These range from mobile data collection and crowd sourcing to network analysis and educational games.

98. Moldsilva's information systems do not adequately address the need for the information required for the efficient and effective management of the resources under its stewardship. The IT equipment is to a large degree outdated and incapable of hosting or running the type of information system required It will be important that Moldsilva increases its ICT capacity in a phased and planned manner to assist it in (a) engaging with and informing the public and forest sector stakeholders, (b) the enhanced management of the forest resource e.g. though the introduction of a forest management information system (FMIS), (c) improving internal communication and (d) undertaking and facilitating the planned institutional reform.

2.6 Forest Certification

99. Forest certification provides an independent assurance that the quality of management practiced by an enterprise conforms to specified standards. Performance standards form the basis of any certification scheme. In the case of forests, the management of the forest is compared to a standard of good forestry practice.

100. There are a number of forest certification schemes worldwide, but in Europe the two most active schemes are the Forest Stewardship Council (FSC) and the Program for the Endorsement of Forest Certification Schemes (PEFC).

101. The main state-owned forest enterprises in Europe have become certified for a combination of reasons, not least being the recognition that markets for timber and timber related products are increasingly demanding that products are certified. Secondly, certification demonstrates to the public, to the forest sector stakeholders and to the environmental community that forests are being responsibly managed. It also provides

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[34] same

[35] WTTC. 2013. Travel and Tourism Impact 2013: Moldova. World Travel & Tourism Council, London

greater transparency as to how forest resources are managed and an opportunity for stakeholders to engage with forest owners including the state.

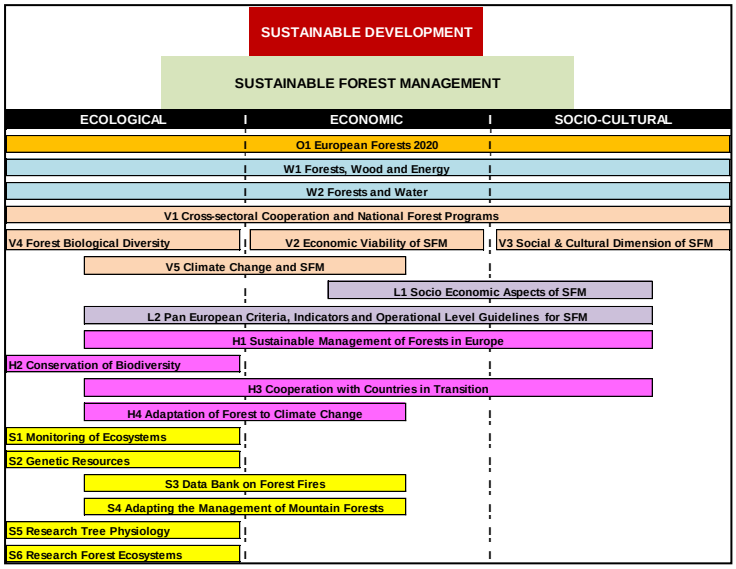
102. Moldova does not have a national forestry standard and Moldsilva, which is responsible for the management of the state forests, is not certified. There would be little or no market advantage to Moldsilva becoming certified as the greater proportion of the wood it sells is for local firewood use. However there would be benefits in terms of demonstrating to the public and to Government that it is managing forest resources in a responsible manner. It would also align Moldsilva with its counterpart forest organizations across Europe, not least within the EU.

2.7 Forest Europe

103. FOREST EUROPE is the pan-European policy process for the sustainable management of the continent's forests founded in 1990. It develops common strategies for its 46 participating countries and the European Union on how to protect and sustainably manage forests.

104. Since its foundation, nineteen resolutions have been adopted at six Ministerial Conferences[36] (Strasbourg 1990, Helsinki 1993, Lisbon 1998, Vienna 2003, Warsaw 2007 and Oslo 2011). Through these commitments the concept of sustainable forest management (SFM) has been defined and continuously developed at the pan-European level. Figure 7 shows FOREST EUROPE resolutions

Figure 7: Forest Europe Resolutions



105. Moldova is aware of FOREST EUROPE and accepts its resolutions although it has not yet joined the process due to a combination of cost and capacity considerations. Membership is seen as part of the journey towards EU accession. However while it remains outside the process, the country is somewhat isolated from the broader European forest community. Membership would offer many advantages to Moldova not least being that it would align it more closely with the EU Forest Strategy and Forest Action Plan.

106. The public perception of how state owned forests are managed is not good. Membership of Forest Europe would send out a signal to the public and forest sector stakeholders that the country is committed to the sustainable management of its forest resources and in this regard is aligning itself with the broader European forest community.

2.8 Social Accountability

107. Social accountability (SA) refers to the capacity of citizens to hold the government and service providers accountable for their actions, decisions, and performance, and make them responsive to the needs and demands of citizens. Transparency, accountability and participation are the pillars of SA.

[36] http://www.foresteurope.org/ministerial_conferences

108. The Government of Moldova (GoM) has adopted a policy of proactive disclosure of information through its Open Data Initiative and established mechanisms for citizen engagement in decision making processes. The establishment of the National Council for Participation, for instance, allows civil society organizations (CSOs) to systematically participate in public administration. Notwithstanding these efforts, low stakeholders capacity, lack of resources, and low levels of citizen demand for accountability, hinder progress.

109. The WB SA review[37] found that forestry institutions do provide some information on their websites. However information on their performance, budget, and spending is largely missing. At a local level, the scarce resources of LPAs, coupled with a lack of demand for accountability, also hinder information provision on forestry related decisions. The situation with citizen feedback mechanisms is similarly unsatisfactory. Usually, public authorities register and respond to citizen complaints and requests in due time. However, there is no publicly available information about the types of complaints and the quality of the authorities' responses. While forestry authorities have recently introduced hotlines to enable citizens to report on illegal activities, these channels have only been rarely used so far. Lastly, while citizens' right to directly participate in public administration is supported by legal provisions, public participation in forestry related issues is rather weak and the commitment of local authorities to engage citizens is limited.

110. The WB SA review recommended a number of initiatives for the Government to undertake to strengthen *information provision and transparency,* including public awareness campaigns, publishing performance information and facilitate the engagement of a CSO as an intermediary between Moldsilva, State Ecological Inspectorate, and citizens, as well as engage think tanks and universities to work on policy related matters in the forestry sector. The review also recommended actions by the forestry authorities to amplify *citizen feedback,* and actions for the forestry sector to support *citizen participation in the sector.*

2.9 Economic Impact of Forest Ecosystem Services

111. Recent studies triggered by the process of National Biodiversity Strategy and Action Plan (NBSAP) elaboration made estimations of the monetary value of the forest ecosystems[38]. The studies were based on comparing two scenarios: Business as Usual (BAU) meaning the continuation of the current practices – wood harvesting continuing to support wood consumption at present levels, with high incidence of illegal logging and under potential use of NTFP, while the forest ecosystems are likely to degrade and have a decreasing regulatory capacity in terms of water nutrient and soil erosion; Sustainable Ecosystem Management (SEM) meaning a lower emphasis on wood production and exploitation of the NTFP at a higher sustainable level while the illegal logging is significantly decreased due to a better institutional, legal and technical framework. However this is not entirely feasible unless there are alternative energy supplies for the rural populations e.g. short rotation forestry (SRF) crops, energy plantations, or increased afforestation.

112. Based on the studies, the value of forest ecosystems services (wood, NTFP, etc.) is estimated at 28.3 million USD per year. Under BAU forestry activities may add some 0.6 million USD over the next 25 years to Moldova's economy[24]. However, this revenue will disappear after 27 years as the capacity of ecosystems to generate economically valuable wood and NTFP is eroded. This ignores the considerable losses in other forest ecosystem services (ES) such as carbon sequestration, water and soil erosion regulation and landscape provision and tourism.

113. SEM implies a decrease in forest wood, and NTFP values in the short term but a significant change in terms of illegal logging reduction, as well as increase in scientific forests area. Nevertheless, in the long run, the value of ESs under the SEM scenario will recover, and are projected to generate a higher net present value (NPV) beyond a 25 year horizon. In addition other ES generated / maintained by sustainable forestry (e.g. carbon sequestration, water and soil erosion regulation, landscape) are ensured.

114. As the main users of the forest ecosystem services are the local communities, the values described above represent net socio-economic benefits.

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[37] Social Accountability Review: Forestry Sector in Moldova. Report No: ACS6576, November 11, 2013. ECSSO, Europe and Central Asia

[38] Popa, B, 2013. The Economic Value of Ecosystem Services in Republic of Moldova, UNDP-GEF project National Biodiversity Planning to Support the implementation of the CBD 2011-2020 Strategic Plan in Republic of Moldova, Chisinau.

3 LAND RESOURCES

3.1 Resources and General Description

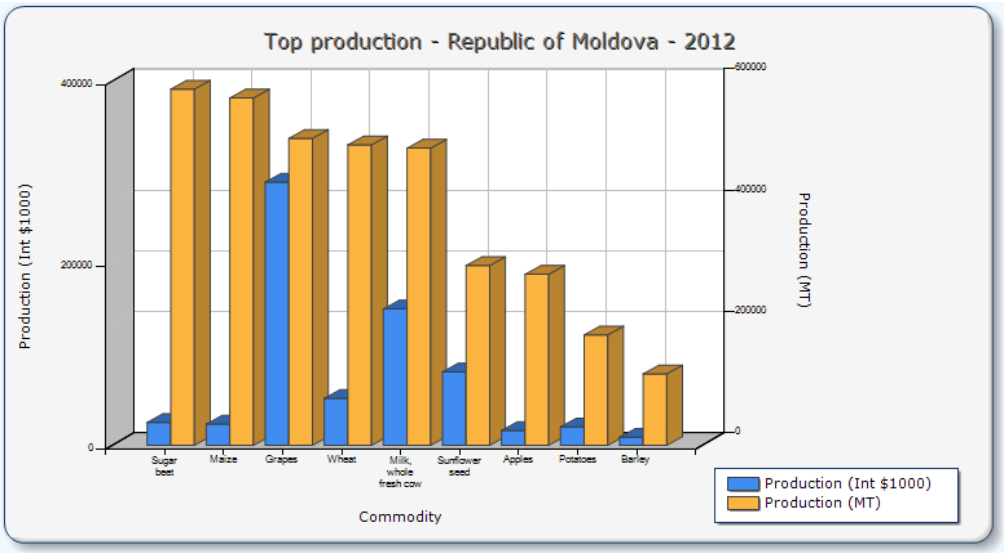
115. Moldova has unique land resources characterized by predominant black earth soils (chernozems) with high productivity potential, very high utilization rate (>75%) and rugged topography (more than 80% of arable land is located on hill slopes).

116. According to the General Land Cadaster (2014) of a total area of 3,384.6 thousand ha, some 2,500.1 thousand ha (73.9%) is agricultural land comprising 1,816.5 thousand ha (53.7%) arable land, 295.3 thousand ha (8.7%) under perennial plantations, 350.1 thousand ha (10.3%) in hayfields and pastures and 38.7 thousand ha (1.1%) is fallow. Lakes and rivers accounted for 96.9 thousand ha (2.9%) and other lands totaled 319.3 thousand ha (9.4%).

117. Agricultural land by owner classification is agricultural cooperatives (6.3%), joint stock companies (2.0%), limited liability companies (34.0%), peasant farms (27.6%), agricultural land attached to individual houses and gardens (14.2%), land associations for growing orchards and vegetables (0.3%) and the reserve fund and other land (15.6%). Large and medium farm areas account for 42.3%.

118. The main crops grown are sugar beet, maize, grapes, wheat, sunflower seed and potatoes (Figure 8). There is also a very active vegetable and fruit growing sector.

Figure 8: Moldovan agricultural production and value by crop (2012)



119. Animal numbers (cattle and sheep) have decreased in recent years due to a combination of rural migration to urban areas and the demise and disbanding of the former large agricultural complexes. In contrast the numbers of poultry show an increase (Table 10).

Table 10: Numbers of Farm Animal Produced ('000s) by Year

	2009	2010	2011	2012	2013
Cattle	243	236	224	204	191
Sheep and Goats	866	915	905	832	824
Pigs	404	512	472	439	410
Poulty	22,987	23,811	34,564	NA	NA

120. The agriculture sector is crucial for Moldova, both as an important part of the economy and as a source of employment. Improving competitiveness in the sector, enhancing safety and quality, as well as ensuring that sales of Moldovan products can be strengthened both domestically and internationally is a priority for Government.

121. The “Strategy for Agriculture and Rural Development of the Republic of Moldova 2014-2020” approved by Government in June 2014, establishes three priorities of developing the farming sector and rural environment by 2020: enhancing the agri-food sector's competitiveness via modernizing and integrating the market, ensuring a lasting management of natural resources and improving the living standards in rural regions. The strategy's enforcement is expected to improve the value of the agri-food sector and access to new

markets, increase the market quota in Moldova and abroad, optimize the structures and use of the land resources, and the water resources management process is to be upgraded.

3.2 Land Degradation

122. Based on the General Land Cadaster[39], the area of degraded agricultural land is 858,564 ha, or 46.7% of the agricultural land area. Some 12% or 100,000 ha are heavily eroded and 29% are affected by moderate erosion.

123. Soil degradation has increased in recent years, due to unsustainable agricultural practices and/or poor management of waters, as well as the degradation of the forest belts. Over the last 35 years the area of degraded agricultural land increased by 264,400 ha or 10.4% of the total agricultural land area[40]. The annual loss of fertile soil due to erosion is estimated at 26 million tonnes. The annual total direct and indirect losses caused by erosion are estimated at 2.432 billion MDL.

124. In addition, there are 84,000 ha that are considered degraded land (non-agricultural) affected by severe occurrence of landslides and ravines. The area affected by landslides is increasing at a rate of 1,000 ha annually.

Figure 9: Area affected by landslide (http://cim.mediu.gov.md/raport2004)

125. Land degradation is also evident in the pasture areas. According to available information[41], most of existing pastures (lands suitable for hay and grazing) are degraded or in very bad condition[21]. Several incentives of pastureland management have been successfully implemented by ICAS under the partnership with the World Bank. There are also incentives of steppe (pasturelands) rehabilitation in southern Moldova (e.g. projects of Bird Life International).

126. Although the regulatory framework (GD 667/2010 and other regulations) does state the terms and conditions of grazing, these are not respected. LPAs, who own more than 95% of the pastures, do not implement any sustainable pasture management measures so these areas are almost not managed. Silvopastoral systems are not being practiced. Recently, some international financially assisted projects are attempting to rehabilitate some pastures within the Orhei National Park, and to introduce some recognized best practices[42].

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[39] http://date.gov.md/ro/system/files/resources/2013-08/Cadastrul-funciar_2011.xls

[40] http://cim.mediu.gov.md/raport2004/ro/firstprobl/sol/degr_niv3_ro.htm

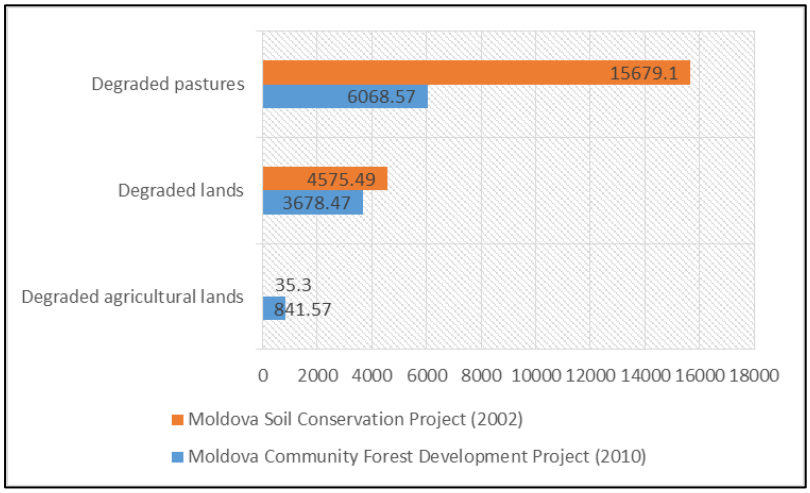
[41] Clima East: Sustainable management of pastures and community forests in Moldova's first National Park Orhei to demonstrate climate change mitigation and adaptation benefits and dividends for local communities. UNDP, 2013.project document.

[42] Clima East: Sustainable management of pastures and community forests in Moldova's first National Park Orhei to demonstrate climate change mitigation and adaptation benefits and dividends for local communities. UNDP, 2013.project document.

Figure 10: Land degradation due to poor pasture management[43]

127. There is good expertise in the afforestation of degraded land and degraded agricultural land. There are at least two successful carbon sequestration projects which demonstrate the capacity of Moldsilva and ICAS to implement large scale afforestation of these areas. Between 2008 and 2013 Moldsilva afforested circa 60,000 ha of land, of which 20,400 ha are outside the NFF. The categories of land included in the afforestation are shown in Figure 11 and were mainly owned by the LPAs.

Figure 11: Usage category of the area afforested by Moldsilva under MSCP and MCFDP[44][45]



3.2.1 Land Degradation and Afforestation

128. The GoM has recognized the land degradation problems and adopted in 2003 a country-wide program for capitalization [utilization] of new land and increase in soil fertility - Program for conservation and increase in soil fertility for 2003–2010. Due to the lack of funding as well as some shortcomings in the collaboration of the authorities only 5% of the initial objectives of the program were met and a new Program for conservation and increase the soil fertility for 2011 – 2020 was approved (in terms of forestry the achievements were up to 44% of the objectives). The program goal is to implement measures to halt the degradation and soil fertility loss through the implementation of modern techniques and technologies and environmental friendly practices. Along with other activities mentioned in the program, it states that soil erosion problems could be solved through afforestation activities on lands affected by landslide and ravine formation.

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[43] UNFCCC/CCNUCC Project design document form, Moldova Soil Conservation Project, 2008.

[44] UNFCCC/CCNUCC, Moldova Soil Conservation Project, 2008, Project Document

[45] UNFCCC/CCNUCC, Moldova Community Forestry Development Project, 2010, Project Document

129. The Government has recently approved the National Plan for forest vegetation extension 2014-2018 (GD 101/2014). This program is based on a survey undertaken by Moldsilva regarding receptiveness of LPAs to the afforestation initiative and envisages the afforestation of 13,050 ha (10,400 ha degraded lands, 1,650 ha water protection belts and 1,000 ha forest belts for field protection). The main goal of the Plan is to maintain forest plantations and ensure their protection against illegal logging, illegal grazing and prevention of other illegalities. The resources to support implementation refer to the National Environmental Fund (administered by the MoE) and other donors. Nevertheless, Moldsilva has proved in the past that mobilization of resources, including financial resources for afforestation is possible, especially when there is the political will.

3.2.2 Land Degradation and Forest Belts

130. Forest belts in Moldova have a long tradition, being established post 1947 for agricultural land, water banks and transportation routes protection and soil erosion reduction. The total extent of the forest belts is 30,300 ha. The main species are black locust (36%) and walnut (38%), but there are 12 other indigenous species and 8 exotic species[46].

131. There are no centralized data regarding the present status of forest belts, however different sources[47] indicate that many areas are affected by illegal logging, abusive/uncontrolled grazing, waste pollution or different degradation factors. There are almost no FMPs for forest belts (except for circa 1,000 ha).

132. All areas covered with forest belts are publicly owned by the LPAs (some small surfaces are also owned by the Ministry of Transportation, Moldovan Water Agency and Ministry of Agriculture and Food Industry). This is a positive factor in relation to any initiatives for their rehabilitation at national or local level. These are well regarded by farmers and communities and can contribute to the future revitalization of agro-forestry practices.

133. Considering the acknowledged role of the forest belts in mitigating the effects of wind and water on soil erosion, as well as their positive contribution to agricultural land productivity, their rehabilitation and the creation of additional forest belts are actions that can be regarded as significant priorities for the forestry sector and should form part of any national afforestation program.

134. It would be wrong to consider forest belts in isolation as a measures to mitigate against soil degradation. A holistic approach is required which includes improved livestock rearing, soil management and agricultural practices, all of which have a major role to play. The WB Agricultural Competitiveness Project[48] includes a sub-component that would support community-level activities aimed at reversing the degradation of the forest belts in the South of the country, where soil degradation is reaching alarming proportions. Specifically, support would be provided for the procurement of specialized machinery and equipment for the creation of two mobile mechanized squads for the rehabilitation of anti-erosion shelterbelts with an area of 2,000 ha. The underlying technical works for the rehabilitation of the shelterbelts will be carried out by the forestry enterprises of Moldsilva in cooperation with local communities.

4 BIODIVERSITY CONSERVATION

135. Moldova is rich in species diversity considering the absence of mountains and moderate variations in climate. There are no known endemic species in Moldova. The country hosts 1,842 species of vascular plants and nearly 4,600 species of lower plants and fungi. There are circa 16,540 species of animals (461 vertebrates and more than 16,000 invertebrates) reported and undoubtedly many more yet to be found as inventories are continually expanded for the invertebrates. The highest diversity of vertebrates is found in the forests of the Codrii region. The river corridors and associated wetlands are particularly important for migratory birds[49].

136. Currently, the system of protected area covers 189,386 ha (or 5.61% of the country). Of this, some 45.19% is located in the National Forest Fund (including 26.18% in forests managed by Agency Moldsilva).

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[46] Gh. Postolache, 2008. Cu privire la Crearea Carcasei Forestiere. Rev Bot, Nr 1, Vol. 1, Chisinau.

[47] Clima East: Sustainable management of pastures and community forests in Moldova's first National Park Orhei to demonstrate climate change mitigation and adaptation benefits and dividends for local communities. UNDP, 2013.project document

[48] World Bank. 2012. *Moldova - Agriculture Competitiveness Project*. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/2012/04/16224219/moldova-agriculture-competitiveness-project

[49] GEF- UNDP project PIMS 4016 Improving coverage and management effectiveness of the protected Areas System in Moldova. Project document

There are many small protected areas. The natural reserves and the recently established National Orhei Park (33,792 ha) are among the largest and most important protected areas.

137. Moldova is changing the system of protected area (PA) classification as well as improving management and coverage of the PA system, strengthening capacity to effectively manage a representative PA system using international financial assistance through the UNDP/ GEF project *Improving coverage and management effectiveness of the protected Areas System in Moldova.*

Figure 12: Orhei National Park potential model for local community development and protection of biological diversity (www.undp.org)

138. The legal and regulatory framework for biodiversity conservation and protected areas includes international agreements endorsed by Government, national laws and regulations and GDs[18].

139. Four of the five Scientific Reserves – Codrii, Padurea Domneasca, Plaiul Fagului and Prutul de Jos - and Orhei National Park are under the direct operational management of Moldsilva. It is also responsible for the management of landscape reserves, forest nature reserves and forested portions of the Ramsar sites.

140. The draft second NBSAP[50] identifies several key issues for biodiversity conservation: i) insufficient institutional capacity for PA management, ii) insufficient funding for PA management and biodiversity conservation, iii) insufficient collaboration between central and local public administration in the area of establishing and management of PAs and iv) the absence of PA management plans.

141. As forest ecosystems provide shelter for the greater part of the national biodiversity and are the location of the majority of protected areas, their role in the sustainable development needs warrants priority at a national level. As part of its integrated response to addressing the threats to biodiversity, the Government of Moldova (GM) has committed to establish a National Ecological Network (NEN). The NEN emphasizes the importance of a landscape level approach as a mechanism to conserve key ecological processes and patterns. To effect the NEN, the National Program for Establishing the Ecological Network adopted in 2011 describes: i) the legal framework for the creation and development of the NEN as part of the pan-European ecological network; ii) the establishment of a regime of protection and use of the functional elements of the NEN and the establishment of new protected areas (National Parks and Biosphere reserves) and iii) the competencies and obligations of the public administration bodies in the implementation of the NEN

142. Being the largest PA administrator, Moldsilva has important responsibilities in biodiversity conservation. This is the compelling reason why the planned forest sector institutional reform should also focus on a better separation of functions in the area of PA management.

143. Based on the studies undertaken by UNDP[51], the PA network management is financed from the following sources: Moldsilva's budget (as public authority) 89% (mainly from wood harvesting), MoE budget 1% and external donors 10%. The financial gap is estimated as being 1.2 million USD annually in the basic

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[50] National Biodiversity Strategy and Action Plan Republic of Moldova, Ministry of Environment, 2013, Chisinau

[51] V Zubarev, 2011. Financing plan for PA governmental bodies, UNDP Chisinau.

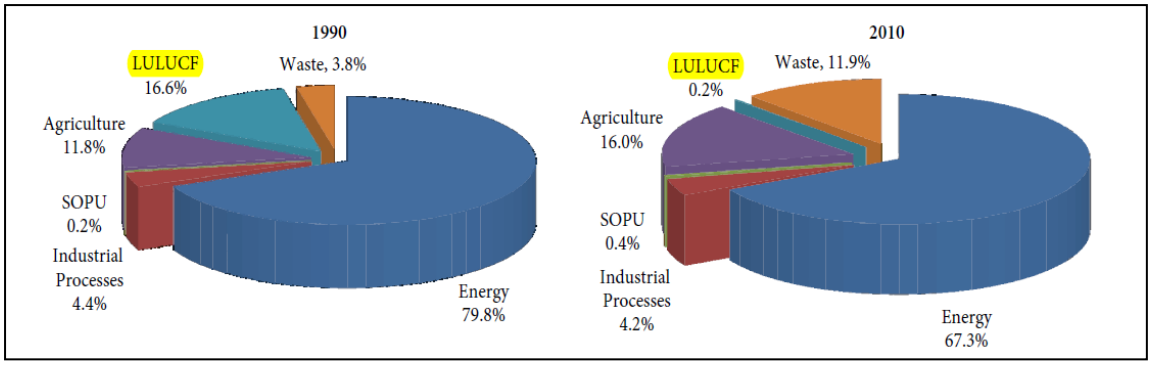
needs scenario and 1.6 million USD in the optimal scenario (55% of the total needs in the optimum scenario). This provides room for further and more significant involvement of the central authority in charge of environmental protection.

5 CLIMATE CHANGE

144. Moldova signed the UNFCCC in June 1992 and it was ratified by Parliament in March 1995. In February 2003, Moldova ratified the Kyoto Protocol. However, as a non-Annex I Party, Moldova had no commitments to reduce GHG emissions under the Protocol during the first commitment period (2008-2012).

145. In 1990 Moldova contributed only circa 0.3% of total global GHG emissions. Within the period 1990-2010, the total national GHG emissions (without LULUCF) decreased by 69.3%, which is greater than in some industrialized countries and economies in transition included in Annex I to the Convention.

Figure 13: Contribution to GHG Emissions by Sector



146. Generally, during the period 1990-2010 the LULUCF sector represented a source of net carbon removals, the exceptions being in 1997, 2004, 2008 and 2010 when the sector represented a source of net emissions due to increased emissions from cropland as shown in Table 11.

Table 11: LULUCF Emissions (Forests and Forest Belts)

Year	Emissions 5A sector (forests) – Gc Co2 e	Emissions 5B1.1 sector (forest belts and other vegetation types) – Gc Co2 e	Balance	Weight in comparison with year 1990, %
1990	-2197,6	-725,2	-2922,8	100.0
1991	-1924,1	-613,1	-2537,2	86,8
1992	-1766,5	-614,0	-2380,5	81,4
1993	-1491,4	-611,9	-2103,3	72,0
1994	-1743,7	-590,3	-2334,0	79,9
1995	-1620,8	-598,6	-2219,4	75,9
1996	-1705,1	-551,0	-2256,1	77,2
1997	-2132,2	-573,4	-2705,6	92,6
1998	-2027,9	-551,0	-2578,9	88,2
1999	-2111,2	-533,4	-2644,6	90,5
2000	-2140,3	-523,4	-2663,7	91,1
2001	-2195,4	-507,7	-2703,1	92,5
2002	-2134,9	-477,6	-2612,5	89,4
2003	-2135,9	-474,0	-2609,9	89,3
2004	-2183,7	-466,4	-2650,1	90,7
2005	-2246,2	-465,3	-2711,5	92,8
2006	-2087,9	-472,1	-2560,0	87,6
2007	-2192,4	-477,1	-2669,5	91,3
2008	-2223,0	-480,0	-2703,0	92,5
2009	-2251,7	-483,6	-2735,3	93,6
2010	-2193,3	-470,5	-2663,8	91,1

147. In January 2010, Moldova associated itself with the Copenhagen Accord and submitted an emissions reduction target that is specified in Annex II of this Agreement "National Appropriate Mitigation Actions in

Developing Countries". The aim of the mitigation actions is "*to reduce, to not less than 25% compared to the base year (1990), the total national level of greenhouse gas emissions by 2020, by implementing economic mechanisms focused on global climate change mitigation, in accordance with the principles and provisions of the Convention*".

148. The draft *Low Emission Development Strategy of the Republic of Moldova until 2020*, a strategic document prepared during 2010-2013 will allow the country to adjust its development path towards a low carbon economy and achieve a green sustainable development, based on the socio-economic and development priorities of the country. The strategy aims to increase by 2020 the carbon sequestration capacity of the LULUCF sector by 25% compared to the baseline.

149. Moldova's Second National Communication to the UNFCC[52] included an extensive list of mitigation measures to help combat climate change during the 2009-2013 period in the forestry sector under the headings of (a) sectoral policies, (b) legal, regulatory and institutional framework, (c) international cooperation and investment attraction and (d) education, training, research and development. While a number have been completed e.g. survey on wood consumption, most still remain relevant.

150. Moldova's Third national Communication to the UNFCC[53] includes a series of mitigation actions which aim to increase by 2020, the carbon sequestration capacity of LULUCF by 25% compared with the BAU scenario. Actions include expansion of afforestation, rehabilitation of forest protection belts, energy crops and support for improved management of community owned forests.

5.1 Impacts of Climate Change

151. European forests are subject to multiple pressures and can suffer a series of damages from biotic and abiotic sources. Furthermore, the impact of climate change, which will have a clear latitudinal effect through the increase of temperatures and drought in southern Europe, is already noticeable in the altitudinal gradient. Species at the lower altitudes of mountains in Europe are already suffering from decreased precipitation and increased temperature[54]. Therefore, the immediate effect that climate change signals is the shift in the range of suitability for forest tree species across Europe. These changes will certainly lead to an increase of biotic damages, as species become increasingly susceptible to attack from pests. Forests will also become more susceptible to abiotic damages produced by more frequent windstorms, droughts and forest fires.

152. Based on simulation and scenario modeling, the projections for Moldova indicate that the current extreme events of rare occurrence with maximum temperatures of 34-35°C for the reference period 1961-1990 will probably in future become average maximum summer temperatures. The more general projections for Europe show that the risk of flooding increases in the Northern, Central, and Eastern Europe and the current droughts, which occur currently once every 100 years, will repeat every 50 years and more frequently in the Southern and South-Eastern Europe, including Moldova. Currently, the largest part of Moldova is characterized by a dry or sub-humid climate. The climate change forecast is that aridity, which leads to a high incidence of droughts, will intensify significantly even by 2040. Aridity will become more pronounced in the plant growing period from June to October.

153. Researchers expect that even small changes in temperature and precipitation could greatly affect future forest growth and survival, especially at ecosystem margins and threshold areas such as forests in Moldova. Climate change would impact future moisture conditions in forests through changes in both temperature and precipitation patterns. As the temperature increases, water loss through evapo-transpiration increases, resulting in drier conditions. Higher temperatures also tend to decrease the efficiency of water use by plants. In some areas of Moldova, future decreases in precipitation will augment the moisture stress caused by warming. Changes in the seasonality of precipitation and the occurrence of extreme events, such as droughts and heavy rainfall, will also be important. The assumed impacts of climate on both forestry and the population are shown in Table 12.

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[52] Ministry of Environment and Natural Resources (2009) Second National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change.

[53] Ministry of Environment and Natural Resources (2013) Third National Communication of the Republic of Moldova Under the United Nations Framework Convention on Climate Change

[54] Source: MOTIVE and Trees4Future FP7 projects

Table 12: Assumed socio-economic impacts of climate change on the forest sector[55]

Impact category	Impact on forestry sector	Social/economic impact
Increased temperatures, heat waves	Longer growing season; Negative consequences for species sensitive to temperature changes; and Increases in vulnerability to forest fires.	Decrease in volume of wood production; Transition to other forms of energy; and Additional costs to the public.
Change in precipitation patterns	Change in the phytosanitary condition[56] Changes in species composition; and Changes in the types and incidence of pests and diseases.	Modification of forest habitat's capacity for biologic diversity maintenance, environmental protection and provision of specific socio-economic functions.
Extreme events: droughts, fires, wind storms and floods	Reduced growth and biomass production; Increases in forests fires; and Increased seed mortality rate.	Economic losses in forestry sector; Reduced wood provisions for communities; increased illegal activities.

5.2 Impact on Tree Species and Ecosystems

154. The impact on individual tree species can be either negative or positive depending on the site conditions and regional climate changes. Hornbeam and ash will be the most vulnerable species with ash showing a 20-40% decrease in biomass growth. Sycamore and lime are forecast to show increased growth up to 2040 followed by a steady decrease. Beech which is at the lower limit of its natural range will show a decrease in volume production of up to 50% by 2050s but in the short-term will still participate in producing stable forest structures from an ecosystem and forest-productive point of view. The sessile oak will be unaffected by the new climate conditions showing an increase in volume production up to 2090 followed by a decrease. The impact on pedunculate oak is less well documented but equally if not more important from a national perspective.

155. Building stable diversified forests adapted to climate change presents a significant challenge and will require on-going measures including research on species selection including adaptive provenances and genotypes focusing on native species.

5.3 Mitigation Measures

156. The strategy on reducing emissions highlights a number of possible mitigating actions including (a) afforestation of protection zones and bands for rivers and water reservoirs, (b) increasing the afforested area based on degraded land and (c) extending the areas covered with forestry vegetation from outside the forestry fund, including the greater promotion of agro-forestry and forestry-pasturing practices. In addition, the better management of existing natural forest ecosystems and the promoting high management regimes can play a significant role.

157. Moldova has gained valuable experience in the design, implementation and monitoring of LULUCF carbon projects under the Nonpolluting Development Mechanism of the Kyoto Protocol, notably (a) the "Soil Conservation in Moldova" Project, and (b) the "Development of the Communal Forestry Sector in Moldova" Project. This experience will help position Moldova to source additional carbon projects which could support the strategy for reducing emissions.

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[55] Climate Change Adaptation Strategy in the Republic of Moldova

[56] Within the 2010-2039 period, it is expected that the phytosanitary condition (e.g. plant health) will change significantly in the Northern part of the country where areas with trees drying out will expand by circa 15-25%. In 2040-2069, the change of the phytosanitary condition determined by the trees drying level in the Northern part of the country will strongly aggravate expanding towards South and South-East. Significant changes will take place between 2070-2099. In the Northern part the forests will dry out intensely.

6 ISSUES

158. The following table brings together the policy issue areas identified during the preparation of this policy note. The list is not intended to be exhaustive but rather focused on the main and immediate issues and challenges facing the forestry sector. The context for each policy issue is provided together with possible actions and or interventions. The context is drawn from the main body of the policy note but summarized again here for clarity and to enable the reader to have an overview of the issues and their resolution and or interaction. All of these issues are of high priority but an attempt has been made to provide some guidance on the level of importance and possible time frame for action.

Table 13: Summary of Issues to be addressed

Issue	Modernising Forestry Institutions	Timing and Priority
1. Institutional Reform	Recent political developments in Moldova are oriented towards institutional reforms at all levels of the central administration, as stated in the *Reform Strategy of Central Public Administration* (GD 1402/2005) and in the Government activity program *"European Integration: Liberty, Democracy, Welfare*". In this recent context, the Government emphasizes the importance of restructuring the forestry sector according to the *General Plan of Actions regarding the Implementation of the Strategy of Sustainable Development of the National Forestry Sector*. The main objectives of the Strategy for Institutional Reform of the Forestry Sector in Moldova (FIRSM) are: i) Separation of regulatory, management and control functions within forestry, ii) Strengthening the regulating and monitoring capacity of the central authority for forestry and implementation of a unitary policy for forest development and conservation, iii) Efficiency of public forest management, based on sustainable management of forests, iv) Sustainable management of forests that do not belong to the state, v) Adapting forestry products and services to the market economy and creation of an optimal framework for business environment to be involved in specific forestry sector activities, vi) Strengthening the professional capacity of the foresters through education, permanent training and career management system. Initiating the proposed reform through the FIRSM action plan will require political will and commitment from Moldsilva. **The initial priority should be to separate the management, control and regulatory functions and strengthen the regulatory and monitoring capacity of the forest authority**. Together these two measures will support the introduction of other reforms throughout the sector. A fundamental reform of Moldsilva focussing on good governance, the implementation of strong robust budgeting and financial systems, more transparent business processes and identifying and developing efficiencies throughout the organization is required and would lead to management efficiency, transparency and accountability providing assurance to Government and stakeholders about the future sustainable development of state owned forests. This will require investment in additional resources e.g. IT and forest management information systems. **The reform should provide more opportunities for engagement with the private sector leading to the development of rurally based SMEs providing services in areas such as harvesting, afforestation and other forest activities e.g. NTFPs reducing the dominance of the state sector**. The development of SMEs together with the elimination of corrupt practices will impact positively on employment and help reduce rural poverty. Reform will be key to making progress in many of the related areas such as management of LPA forests, reducing illegal felling and undertaking mitigating measures for climate change and land degradation. The FIRSM action plan provides a sound basis for making progress.	Institutional reform is **high priority** and the process already started to be recommenced as soon as the new government is installed

2. Institutional strengthening and capacity building	The envisaged institutional reform for the sector, based on experience and lessons learned from other countries, will represent a significant challenge for both new and/or reformed institutions. It will be vital that the knowledge and means gaps necessary to support the reform are addressed. **The management of the change process should be overseen by experts in this area, preferably from outside the sector. Staff will need to be trained to understand the change process and changed operating environment and apply this knowledge to the implementation of the reform**. The FIRSM proposed institutional reform is based on cross checking mechanisms for sensitive issues such as illegal logging or conflict of interest. The newly created mechanisms need to be implemented correctly from the very beginning. This underlines the need for training and guidance through the reform process. The envisaged monitoring and supporting (especially for LPAs) role of the central forest authority will require tools for monitoring and regulating. These can be readily done though a GIS based forest information management system (FIMS). Also, a national forest inventory (NFI) will provide an independent clear picture of the forest resources and its evolutions, most needed for policy making purposes as well as for improving the image of the sector.	Although of a high priority, the capacity building needs to implemented once the decision and process of institutional reform has re-commenced
3. Scientific Research and Technology Transfer	Research is relatively short term in nature while a national forest research program and national coordination of forest research are lacking. The development of a strategic research agenda (SRA) approach for the forestry sector would provide direction and prioritize research thereby enabling a more efficient and co-ordinated use of scarce resources. **The immediate need is to address the potential impact of climate change and this could be supported through research on species resistance, forest resilience, adapted forest treatments maintenance and provenance trials**. Other important areas include the afforestation of degraded lands and biological disease control agents and the most appropriate species and cultivation methods for fast growing energy crops. There are also needs for research in other areas e.g. evaluation and conservation of forest genetic resources, forest pathology, game management, etc. There are many innovations and applications developed for other sectors that can be readily used for forestry research and management. The transfer of knowledge and technologies implies qualified personnel in specialized fields, and the need for the improved capacity. Inventory and mapping of biodiversity especially at PAs level is also an important area for research in order to streamline the conservation efforts and optimize the use of forest resources. There is also a need for thematic management plans (i.e. hunting management plan). GIS applied research would facilitate a landscape cross sectoral approach to forest research	**Medium priority**
	Sustainable Wood Supply	
4. Wood Energy	According to official statistics, the contribution of the forestry sector to the energy sector balance is low but an ENPI-FLEG survey contradicts this and shows the **reliance of rural households on fuelwood for heating and cooking**. Woody biomass use for heating contributes to increasing the energy security of Moldova, as well as reducing the country's GHG emissions. However the greater part of the demand for wood energy is being met by illegally harvested material **Short rotation high yielding forest energy crops offer potential and are in line with the approach advocated under the third national communication to the UNFCCC**. A national wood energy program with a target afforestation area using high yielding species suited to the forecast impacts of climate change could dramatically increase the supply of legally sourced fuelwood in a relatively short space of time while at the same time alleviate pressure on existing forest resources from illegal harvesting.	**High priority**. Developing the provision of wood energy will help address climate change and land degradation issues, reduce the demand for illegally harvested timber, and create jobs income opportunities,

5. Illegal Harvesting	Moldova, together with 43 other countries, signed an agreement, committing to developing an Action Plan to combat illegal activities in the forestry sector. As a parallel process to the development of a Moldovan National Action Plan, the ENPI FLEG Program was established to improve governance structures and to strengthen sustainable forest management practices. The officially reported volumes of illegal harvesting are relatively small (1% volume). **Analyses conducted under the ENPI FLEG on illegal logging[57] and wood consumption shows fuelwood consumption is 1.039 million m^3 or three times the reported sale of firewood by Moldsilva**. The main driver is welfare/poverty alleviation with households unable to pay for legally harvested fuelwood or alternatives to fuelwood for heating and cooking. Both poverty and profit driven illegal harvesting are facilitated by corruption across the sector. **The current level of removals (legal plus illegal) from forests is unsustainable** and will, if let run uncorrected, result in not only reduced forest capacity to provide timber and fuelwood but also a reduction in biodiversity and increases in deforestation / degraded forests which in turn will lead to further land degradation and erosion. A number of actions have been undertaken geared towards reducing forestry-related contraventions and offenses. Joint plans by forest authorities have been developed and implemented with a view to ensuring public security and environmental protection in the fight against illegal logging. However these have not as yet proved sufficient and urgent measures are now required to combat illegal logging. Simply reinforcing the regulatory framework will not address the underlying issue of poverty alleviation. **Joint actions are required which will increase the (a) volume of wood for heating e.g. energy plantations in the short term and increased afforestation in the longer term, (b) provide improved management and protection for LPA forests, (c) tackle local level corruption** e.g. through FIRSM implementation and (d) provide alternative and affordable sources of energy for local population.	Addressing the issue of illegal logging is urgent but needs to be done in a way that builds on the institutional change and capacity building and helps ensure the provision of social benefits. **Medium priority** and should be done once the institutional reform and capacity building have been commenced
6. Management of LPA Forests	Many LPAs are also community forests owners with circa 100 thousand ha of forestland and about 30,000 ha protection belts. **Most of LPA forests do not have FMPs and quite often lack any form of active management**. Initiatives to have FMPs for these forests were undertaken utilizing funds from international projects (such as ENPI-FLEG, Government of Japan Clima EAST) but only 16,000 ha has been completed to the end of 2013, although this figure is likely to increase over the next 5-10 years. These forests are under significant anthropic pressure from illegal harvesting and will continue to degrade unless remedial measures are introduced now. **The future of sustainable management of the LPA's forests will depend on a combination of the institutional reform to clarify roles and the introduction of forest management plans together with initiatives to secure professional management of these areas for the benefit of local communities**. Many communal lands afforested during 2002-2010, have not yet been returned by Moldsilva back to the LPAs. Some LPAs owners do not want to take back the forests while others lack the resources to ensure their guarding after handing over. This could be resolved through an initiative to assist recently established forest owners build agreements with state forestry enterprises to undertake FMP and guarding and associated activities. Alternatively by enhancing institutional capacity of LPAs to undertake guarding (institutionalizing forest staff, or other staff with responsibilities for forestry), also including training of such staff (which is already being done by ICAS through a National Forestry Consultative Office).	**Medium priority:** this should be addressed as part of the institutional reform and capacity building have been commence

[57] Dumitru, G., Ciobanu, A., Scobiola, M., Stangaciu and Lozan, A. (2012) Illegal Logging in Moldova. Analytical Study 2010-2011. Report prepared under the ENPI FLEG Program

	Climate Change incorporating Landscape Approach	
7. Climate Change	**Researchers expect that even small changes in temperature and precipitation could greatly affect future forest growth and survival**. Within the 2010-2039 period, it is expected that the phytosanitary condition (e.g. plant health) will decrease significantly in the Northern part of the country where areas with trees drying out will expand by circa 15-25%. In 2040-2069, the decrease in the phytosanitary condition in the Northern part of the country will strongly accelerate expanding towards the South and South-East. Significant changes under this aspect will take place between 2070-2099. In the Northern part the forests will dry out intensely. **Maintaining and building stable diversified forests adapted to climate change presents a significant challenge and will require on-going measures including research on species selection including adaptive provenances and genotypes**. The strategy on reducing emissions highlights a number of possible mitigating actions, including (a) afforestation of protection zones and bands for rivers and water reservoirs, (b) increasing the afforested area based on degraded land and (c) extending the areas covered with forestry vegetation from outside the forestry fund, including the greater promotion of agro-forestry and forestry-pasturing practices. The focus should be on the use of native rather than exotic species. Moldova has gained valuable experience in the design, implementation and monitoring of LULUCF carbon projects and this experience could be used to leverage funding for many of the mitigating measures.	Climate change should be one of the **highest priority.**
8. Land Degradation and Afforestation	**Soil degradation has increased in recent years**, due to unsustainable agricultural practices or bad management of waters, as well as the degradation of the forest belts. Some 46.7% or 859 thousand ha of agricultural land is degraded while FLEG Moldova estimates that 70% of pastures are degraded or in very bad condition. The network of forest belts extending to 30,300 ha and established from 1947 onwards provide valuable protection to soils. Their status is not documented but different sources indicate that many are affected by illegal logging or other degradation factors. Government has recognized the land degradation problems and adopted a country wide *Program for capitalization [utilization' of new land and increase of soil fertility (2003)* which included afforestation measures. Due to the lack of funding program objectives were not achieved[58] and a new Program for conservation and increase the soil fertility for 2011 – 2020 was approved. . In February 2014 the Government approved the National Plan for forest vegetation extension 2014-2018. This program is based on a survey undertaken by Moldsilva regarding openness of LPAs to the afforestation initiative and envisages the **afforestation of 13,050 ha of degraded lands and water protection forest belts**. **The introduction of silvopastoral practices offers the opportunity to not only enhance habitat diversity but also to help halt the level of land degradation in pastures.** A series of regionally based pilot projects could be a first step with the potential to be extended nationally over time depending on funding. In the fight to mitigate the impact of land degradation, it will be important that the planned afforestation of degraded land and the extension of the forest belts network is undertaken in a timely fashion and that due recognition is afforded to the potential impacts of climate change in terms of species selection and composition.	**High priority.** Addressing land degradation and undertaking afforestation of shelterbelts will help reduce demand for illegally produced wood products, create job opportunities, improve agricultural production and help contribute towards climate change mitigation and adaptation

[58] Clima East: Sustainable management of pastures and community forests in Moldova's first National Park Orhei to demonstrate climate change mitigation and adaptation benefits and dividends for local communities. UNDP, 2013.project document

	Public Perception of Forestry Sector	
9. Public Perception of Forestry Sector and Moldsilva and increasing its communication capacity	Surveys under the ENPI East FLEG I Program indicate that the public perception of forestry, Moldsilva and the management of state forest resources will need to be improved. The forest sector and Moldsilva has to a large extent remained isolated from mainstream European forestry where engagement with stakeholders, greater transparency and accountability is now the norm. Continued isolation could see Moldova being left behind in terms of advances in the determination and implementation of SFM principles at a country level Moldova has yet to join Forest Europe and memberships would offer many advantages and send out a signal to the public and forest sector stakeholders that the country is committed to the sustainable management of its forest resources and in this regard is aligning itself with the broader European forest community. Moldsilva is not certified under either FSC or PEFC certification schemes. While there would be little or no market advantage to Moldsilva becoming certified there would be **benefits in terms of demonstrating to the public and indeed to Government that it is managing forest resources in a responsible manner**. It would also align Moldsilva with its counterpart forest organizations in other European countries, not least within the EU. Certification would also help allay concerns by society that State forests are not being managed sustainably.	**Medium priority**

7 OPPORTUNITIES FOR WORLD BANK COLLABORATION

159. The World Bank is already active in a number of forestry and forestry related areas, such as for example, the Moldova Agriculture Competitiveness and GEF Sustainable Land Management Projects, the carbon sequestration projects and ENPI East FLEG Programs. It will be important that any opportunities for support do not duplicate actions under existing projects but rather complement and provide synergy for enhanced outcomes.

160. Although Moldova's recent economic performance has helped reduce poverty and promote shared prosperity, poverty still remains an issue. 75% of the poorest 40% of the population live in rural areas. 45% of the population survive on US$5 per day or less. At the same time a large proportion of the rural population depends on forest for subsistence purposes in terms of firewood for heating and cooking, pasture for grazing and fodder production and non-timber forest products for sustenance and income. Yet, through unregulated over-harvesting, unsustainable grazing practices, and climate change parts of the forest and rural landscapes are becoming less productive with associated implications on the rural population. Support for the forest sector therefore needs to be framed within this context. The following set of recommendations are designed to improve the performance of the sector overall, in a way which will help improve governance, increase the intensity/quality of management to increase the productivity of the forest, whilst contributing to cross cutting issues such as the reduction in rural poverty and climate change.

161. Helping to improve forest sector performance and increasing the sustainability of landscapes will contribute to the reduction of poverty and increasing the wealth of the bottom 40% of the population by: creating and sustaining rural based jobs from increased harvesting opportunities (and future opportunities for further downstream processing); the provision of subsistence products such as fuelwood and NTFPs; improving agricultural productivity and ameliorating land degradation; and improving the productivity from pasture. Improving the holistic management of landscapes can help reduce the incidence and scale of damage from catastrophic events such as landslides, flooding and forest fires.

162. Table 14 shows the opportunities for collaboration with the World Bank. These opportunities are all important, and it is recommended that any cooperation should incorporate all of the issues.

Table 14: Potential Areas for World Bank Assistance

Area	Opportunities
Modernising Forest Institutions including Forest Research	Support for management of the institutional reform change process Training and capacity building to underpin reform process Development of a forest management and information system Develop a Strategic Research Agenda Research on biological control agents Research in genetic resources identification and conservation Carrying capacity studies and inventories for game species Research in the area of forestry economics Research in the area of fast growing species and species Research in the area of climate change mitigation and adaptation measures Research on the landscape integration (agriculture and forestry) Development of research IT capabilities Research on the relationship between ecosystems, biodiversity and climate change
Building Sustainable Wood Supply	Planting of energy plantations (LPA) Trials for suitability of specific clones and cultivars Extension of Forest Management Plans to LPA community forests. Strengthening capacities of communal forest owners for sustainable forest management Ecological construction of degraded stands Design and implementation of a National Forest Inventory (NFI) Development of a national Forest Standard Support for GIS
Climate Change incorporating Landscape Approach Protected Area Management and Biodiversity conservation	Support for building stable diversified forests Support to investigate the most appropriate species and provenances Support for the building of stale diversified forests Support to investigate ecological adaptation to climate change Afforestation of degraded lands Support for nurseries to meet increased planting, ecological construction and improve quality Rehabilitation / replacement of forest shelter belts (Not in South) Trials of silvopastoral systems on pilot basis Preparing and implementing pilot project with the GEF Support for management planning of PAs including biodiversity inventories and mapping Support for ecosystem services identification and evaluation Eco-tourism infrastructure development Elaboration and implementation of conservation measures for endangered species and habitats Support for the implementation of the future NBSAP
Public Perception of Forest Sector	Public awareness campaigns linked with the implementation of the FIRSM and/or afforestation efforts

APPENDIX 1: FOREST SECTOR REFORM AND FIRSM

Forest Sector Reform - General

There are many examples of reforms to State forestry throughout Europe and beyond. The reasons for these reforms vary but can be attributed to a combination of factors which include:-

- Emergence from a centrally planned economy;
- View (political / societal) that the State should not operate in commercial activities;
- Desire by society that the forests should be protected and enhanced; and
- The initial rationale for State involvement no longer applicable e.g. strategic timber reserves, rural development, social needs etc.

Added to these factors is the progression of international agreements and agenda relating to forests and forestry that advocate the multiple use of forests and a change in forest management, most notable in recent years being sustainable forest management (SFM) and forests contribution to climate change mitigation.

The State has four possible functional roles relating to forest resources:-

1) **Regulatory** – formulating forest policy and elaborating the related legal acts necessary for its implementation, ideally effected in an open process involving sector stakeholders;
2) **Supervisory** – enforcement and control over compliance with the law and the related statutory acts in all forests irrespective of ownership type;
3) **Support** – actions undertaken by the State and its institutions and, or by the financial support from the State to ensure maintenance of the forest's long-term functions and promote the development of the sector; and
4) **Ownership –** management of the State-owned forest property in a manner to retain and increase its value to its owner, i.e. the State, while at the same time providing for the realisation of the forest's ecological and social functions as mandated by the society.

Institutional reforms across Europe can be interpreted as being based on a number of common guidelines:-

a) Institutionally, the State authority functions (regulatory, supervisory and support) are separated from that of managing the State owned forests (the ownership function);

b) Forest policy formulation is separated from the process of its implementation / administration;

c) A supervisory institution activity as a controlling authority with a ministry performs its duties independently to ensure sustainable forest management in line with its mandate as provided by the respective statutory acts;

d) The realisation of the State authority functions are funded by the State budget;

e) The number of employees in the forest sector governance institutions is based on the scale and type of work to be undertaken; and

f) No overlapping of the functions and responsibilities of the State administration institutions

Compliance with the above helps ensure the creation of forest sector governance compatible with a law-governed and democratic country, while simultaneously making the authority functions more efficient and reducing the State budget expenditure for the upkeep of the administrative apparatus.

Forest Sector Reform Moldova

The institutional reform process has two main sections.

I. The operational section – Create only one state forest enterprise dealing with forest administration and some connected activities (regeneration, harvesting, processing) but having cost/profit centres being accountable separately from the main administration activity. This will allow the economic evaluation and reporting for each main activity. There are incentives for a real separation between the resource management and resource valuation on the market. With proper opening for the private sector the self-regulating mechanisms against corruption, conflict of interest and poor economic performance can help the sector to better perform in all aspects. This section also includes the search for and implementing solutions for the management of communal forests and private forests, that are now almost unmanaged.

II. The regulation section – Transform present Moldsilva agency into a real authority in terms of forestry dealing only with the regulating and monitoring functions. In this way the whole operational process described above will not be politically influenced by managers that are also regulating the sector. In order to implement proper institutional reform there is the need for an independent part to ensure the enforcement of the law. Another argument is the fact that sooner or later there will be structures for forest administration that will belong to communities. They should not be regulated by the main competitor on the market.

If Moldsilva will continue to be involved in day by day management, the regulating and monitoring functions may be corrupted and lead to less effectiveness of the reform and less transparency within the sector.

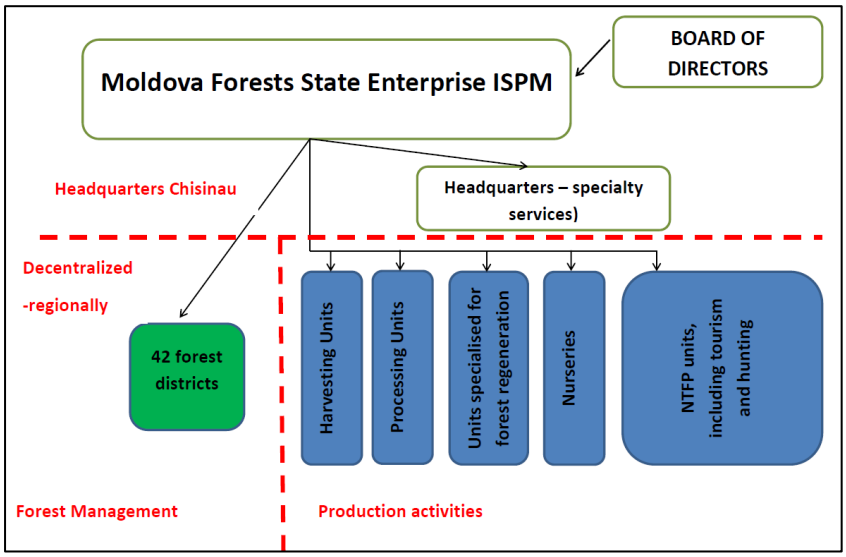
The preparation of FIRSM was based upon a number of underlying principles formulated and agreed at the start of the process:-

a) There is only one policy regarding the forestry sector that is elaborated at central governmental level;
b) The state must have strong position and adequate capacity for formulating and implementing a clear policy for forestry sector;
c) Operational and financial management must be performed at local level in a decentralized fashion;
d) Regulatory and monitoring function must be institutionally separated from the management function
e) Administrating the forest fund and production and commercial activities must be also separated based on cost centers;
f) Protected areas administration must be institutionally separated from the regulatory and monitoring functions;
g) Business environment must have access to products and services markets within the forest sector; and
h) Forestry personnel must prove professionalism, ethics and must be adequately remunerated.

Summary of SWOT analysis during elaboration of FIRSM

Strengths	Weaknesses
- Forest resources increasing - Good management practices in Moldsilva - Good technical expertise, especially in afforestation - Organized management of natural reserves - Existing wood processing capacities	- Overlapping between management/regulation/control functions - High bureaucracy - Forest resources are unevenly spread over the country - Uneven personnel policy - Low added value along the commercial/processing chains - Impossible to identify the profit centers - High level of illegal logging - Low traceability of wood - Low transparency of forestry related

	decisions - No regulations for LPA forests management
Opportunities	Threats
- Demand for forestry products - Increasing development of private enterprises - Carbon market - Increasing interest for eco-tourism - EU accession - Technical developments in terms of regeneration material production (nurseries) - Decision makers interest in strengthening the legal framework for forestry sector	- Increasing political influence - LPA unable to take care of their own forests - Corruption - Climate Change

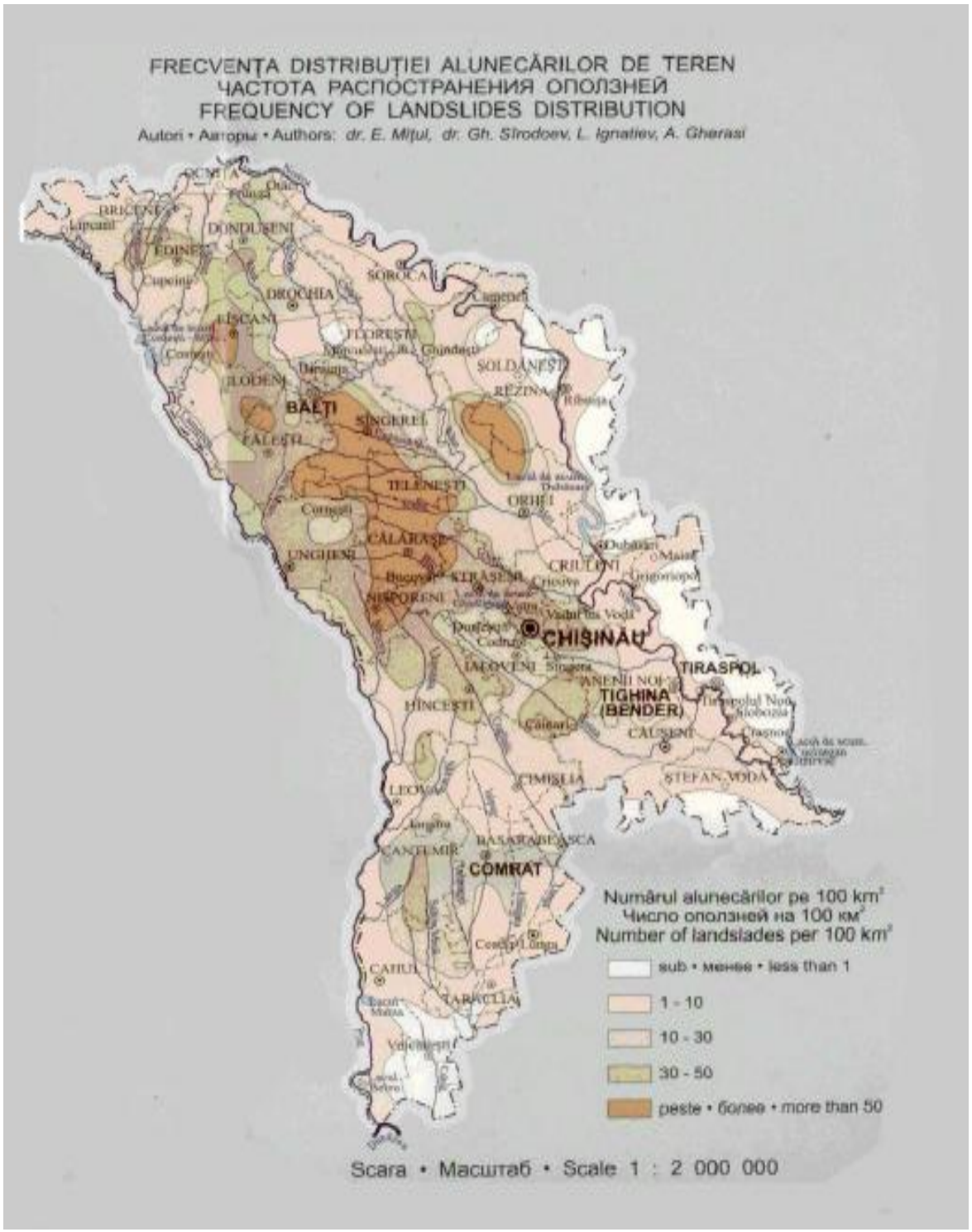


Moldova Forest State Enterprise organization chart[15]

APPENDIX 2: THE MAIN LEGISLATION RELEVANT TO FORESTRY IN THE REPUBLIC OF MOLDOVA

Name	Adopted
Forest Code	887-XIII from 21.06.1996
Land Code	828-XII from 25.01.1991
Waters Code	1532 from 22.06.1993
Environmental Protection Law	515-XII from 16.06.1993
Law regarding water protection zones	440-XII 27.04.1995
Law of animal kingdom	439-XIII from 27.04.1995
Natural Resources Law	1102-XIII from 06.02.1997
Law regarding state protected areas	1538-Xiii from 25.02.1998
Law regarding afforestation of degraded land	1041-XIV from 15.06.2000
Law regarding the ecological network	94-XVI from 5.04.2007
Law of the vegetal kingdom	239-XVI from 8.11.2007
Waters law	272-XVIII from 23.12.2011
Parliamentary decision regarding sustainable development of the forest sector	350-XV from 12.07.2001
Parliamentary decision regarding national strategy and action plan for biodiversity conservation	112-XV from 27.04.2001
Governmental decision (GD) regarding the improvement of the forest administration and forest vegetation protection	595 from 29.10.1996
GD regarding state records of the NFF	1007 from 30.10.1997
GD regarding forest classification	1008 from 30.10.1997
GD regarding the regulation for cadastre of the state protected areas	414 from 02.05.2000
GD for frame regulation for national parks, nature monuments, resource reserves, and biosphere reserves etc.	782 from 03.08.2000; 784 from 03.08.2000
	785 from 03.08.2000
GD for regulation of natural and constructed protected zones	1009 from 05.10.2000
GD for approving the regulation for the establishment of protected areas	803 from 19.06.2002
GD for approving the programme for valuation of land and increase of soil fertility	636 from 26.05.2003
GD for approving the state programme for afforestation of NFF, 2003-2010	737 from 17.06.2003
GD for approving the strategy for sustainable development of forest sector	739 from 17.06.2003
GD for approving normative for forest management	740 from 17.06.2003
GD for approving the allowable cut for forests, 2006-2010	1337 from 16.12.2007
GD for approving the frame regulation for internationally important wetlands	665 from 14.06.2007
GD for approving the forest land lease	187 from 20.02.2008
GD for approving the organization and functionality of Moldsilva	150 from 02.03.2010
GD for approving the national plan for establishment of national ecological network, 2011--2018	593 from 01.08.2011
GD for approving the allowable cut for forests, 2011-2015	1184 from 22.12.2013
GD for energy strategy of Republic of Moldova	102 from 05.02.2013
GD for approving the national plan for extension of forest coverage, 2014-2018	101 from 10.02.2014
GD for Environment strategy and action plan, 2014-2023	301 from 24.04.2014

APPENDIX 3: DISTRIBUTION OF LANDSLIDES

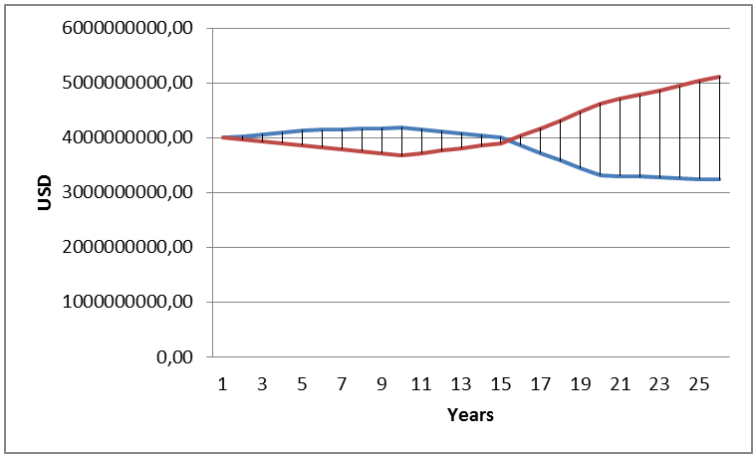


APPENDIX 4: ECOSYSTEM SERVICES - VALUE FOR AGRICULTURE, FORESTRY AND TOURISM

Agriculture

Studies[59] based on comparing scenarios aimed to assess the economic value of ecosystem services. The BAU scenario (the continuation of the current practices) foresees the degradation of pastures and intensive agriculture resulting in increased degradation of soil due to different erosion phenomena leading to decreasing vegetal production. The SEM scenario was modelled based on the assumptions that the pastures are managed in a way that they keep a superior carrying capacity in a sustainable way, while the soil erosion phenomena will reduce in time due to better agricultural practices, afforestation and rehabilitation of forest belts as well as afforestation of the degraded land. The SEM scenario also included an increase in the eco-agriculture practices.

Based on these studies, the value of the provisioning service food for the ecosystems in agriculture is estimated at around $21,900.6 million in 2011; the carrying capacity in under – used pastures in SEM implies a decrease fall in the value of food provided by pastures in the short and long term. However, the annual values after 10-15 years are significantly higher than the BAU values. In addition BAU also sometimes results in irreversible damage to ecosystems. The SEM scenario might lead to a significant increase in vegetal production due to value added by the ecological products while a continuation of BAU in terms of agriculture could cost Moldova's economy some $10,695.784 million over the next 25 years (this is based on the cumulative value of SEM relative to BAU).



Comparison of BAU and SEM scenarios for Agriculture– value of provisioning ecosystem services[28]

SEM requires motivating local communities to maintain traditional breeding practices and use of pastures at carrying capacity.

Forestry

Under **Business as Usual (BAU**) timber harvesting will continue to support a number of wood related industries and wood consumption. Due to the limited extent of protected forests within the PAs, biodiversity losses may occur in some areas, while the protected forests stay at the same level, including the level of harvesting from "scientifically important forests". At the same time, negative impacts on water, nutrient and soil erosion regulation, landscape and air quality will continue. Ineffective enforcement of the legal framework will result in ongoing illegal logging. Cutting every year at a higher level in terms of annual increment will lead to a decrease in the annual allowable cut even if no increase in illegal logging. BAU does not encourage optimal management of NTFPs, and the potential of these products will decrease due to ecosystem degradation.

With the present limited levels of protected forest areas (scientific forests), the potential threat to biodiversity (which is not yet properly assessed due to ongoing lack of funding for proper identification and monitoring of flora and fauna) will lead to continuous degradation of potentially valuable ecosystems, hindering the development of recreation, tourism and educational activities.

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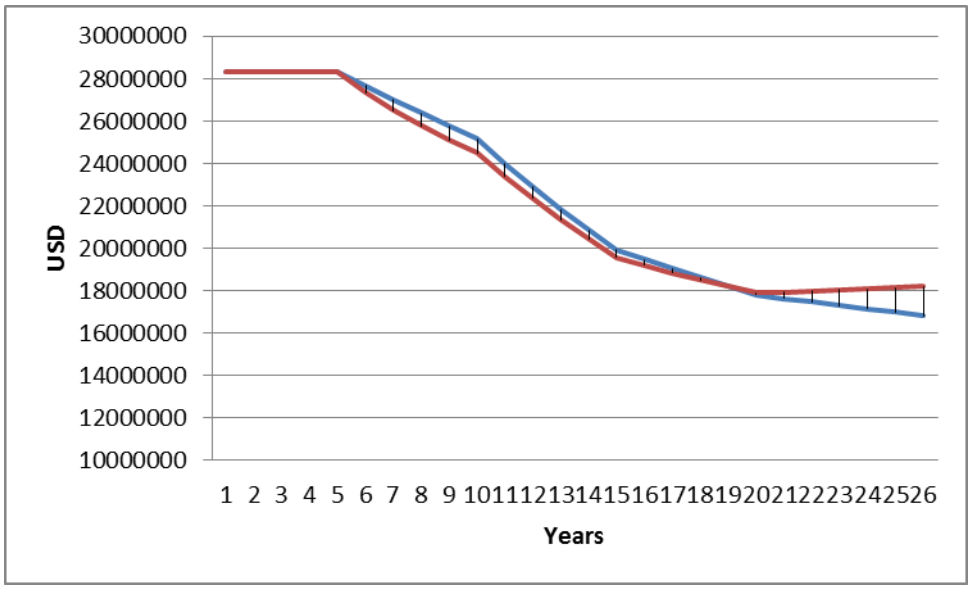
[59] Popa, B, 2013. The Economic Value of Ecosystem Services in Republic of Moldova, UNDP-GEF project National Biodiversity Planning to Support the implementation of the CBD 2011-2020 Strategic Plan in Republic of Moldova, Chisinau.

The **Sustainable Ecosystem Management (SEM)** scenario would involve less emphasis on wood production supported by: (i) an expansion of scientific forests where justified on account of their biodiversity significance; (ii) decrease in illegal logging while the same quantities are harvested legally from the unscientific forests, at a reasonable lower% of the annual increment and, (iii) optimal harvesting of NTFPs. The reduction of forest harvesting will create opportunities for increasing the potential of NTFPs (guided by studies on sustainable use) and enforcement of PA MPs, together with a better enforcement of forestry specific regulations will lead to a reduction in illegal logging.

As illustrated below, while BAU is equivalent or superior to SEM in the short term, in the medium – long term SEM is more profitable. Furthermore in the long term under BAU values continue to decline, while under the SEM the (high) value becomes constant through time reflecting the sustainable management of the forests.



The ecosystems' value to Forestry under BAU and SEM

Tourism

Business As Usual is defined as a continuation of underfunding and a disconnection between the increasing interest in eco-tourism and the quality of the ecotourism experience being offered at sites. In spite of the PAs remarkable natural and cultural resources, the lack of biodiversity studies makes it impossible to know and manage sensitive areas and describe new features and species; damage to biodiversity through tourism may therefore occur and/or tourists may lose interest on account of the lack of biodiversity information. The absence of facilities for visitors also restricts the proper management and accounting of tourist flows. Poor access, visitor facilities, tour guides and management and low diversification will discourage / shorten the duration of visits and willingness to pay. Poor marketing further works against tourists choosing Republic of Moldova as an eco-tourism destination.

In the BAU scenario, the absence of biodiversity conservation measures properly identified through PAs management planning may lead to ecosystem degradation, which will negatively affect tourism demand. Poor water management will impact on water quality, and industry may affect the air quality, while uncontrolled infrastructure development may result in a loss of traditional architectural styles typically favored by tourists[60]. As a consequence of BAU, ecotourism does not develop and visitor numbers and willingness to pay decline.

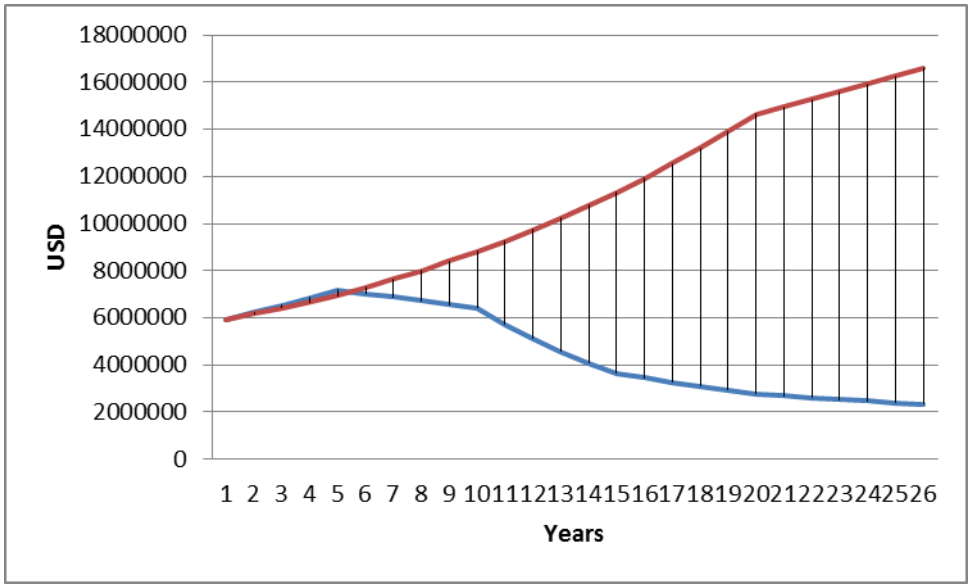
Sustainable Ecosystem Management reflects a situation in which the increasing interest for ecotourism is matched with measures that encourage and optimize its potential. With proper funding, natural sites administrators are able to develop and enforce MPs. The MPs provide for the ongoing evaluation of biodiversity, development and diversification of access and visitor facilities, implementation of special conservation measures,

[60] In Orheiul Vechi, accommodation facilities based on the local architectural styles are more profitable and attract tourists compatible with an eco-tourist profile.

use of compensatory payments, proper control of industrial development and natural resources use, pro-nature education and development of the tourism strategy and management. Under these conditions it is reasonable to count on an increase in tourist numbers, longer visiting periods and increased expenditures and WTP

Sustainable Ecosystem Management (SEM) results in a progressive increase in eco-tourism values at the natural valuable sites, as both the quality of biodiversity and ecosystems and the tourism services offered improve. The increased number of visitors is the main determinant for the increase in PAs revenues. While not considered in the SEM scenario, tourism revenues could be further increased by raising prices / entrance fees over time. Although an increase in the value of tourism is sustained over the 25 years, the rate of growth slows as the ecosystem and biodiversity status is restored and as the natural sites carrying capacity is reached. Sustainable eco-tourism discourages an increase in tourists beyond the sites carrying capacity, visitor numbers therefore plateau in the long run. The PV (10% rate over 25 years) is calculated at $79.8 million level. The figure below illustrates the different trajectory for eco-tourism value under BAU and SEM for Republic of Moldova.

The NPV of SEM is $27.9 million.



Eco -tourism value under BAU and SEM over 25 years

APPENDIX 5: MAIN POLICY DOCUMENTS - FORESTS/FORESTRY

I. Environment / biodiversity

Environmental Strategy (2014)

Strategy and Action Plan in the field of Biological Diversity Conservation in Moldova (2001)

II. Forest development / conservation / extension

Strategy for the sustainable development of the forestry sector of Moldova (2001)

Program for capitalization [utilization] of new land and increase of soil fertility (2003)

Program for conservation and increase the soil fertility for 2011 – 2020 (2011)

National Plan for forest vegetation extension 2014-2018 (2014)

III. Agriculture

Strategy for Agriculture and Rural Development of the Republic of Moldova 2014-2020 (2014)

IV. Energy / wood

Energy Strategy of the Republic of Moldova until 2030 (2013)

V. Climate change / emission

Kyoto Protocol (ratified in 2003)

Low Emission Development Strategy of the Republic of Moldova until 2020 (2013)

VI. Communication / Transparency / Open data

Open Government Partnership (Moldova joint 2011)

Action Plans on Open Government (1st in 2012-2013, 2nd in 2014)

National strategy on informational development "Digital Moldova 2020" (2013)

Concept on principles of open governmental data (August, 2014)

VII. Public administration / EU integration

Government activity program "European Integration: Liberty, Democracy, Welfare" for 2011-2014 (2011)

Reform Strategy of Central Public Administration (2005)