

THE CONTRIBUTION OF THE FOREST SECTOR TO THE NATIONAL ECONOMY AND HUMAN WELFARE IN THE REPUBLIC OF MOLDOVA – AN ARGUMENT FOR SUSTAINABLE ECOSYSTEM MANAGEMENT

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Abstract: *The Republic of Moldova's initiatives for institutional and regulatory framework reform triggered the need for updating the approaches to natural resources management. In this process, the valuation of the ecosystem services provided by the forestry sector is of major interest for policy makers to anticipate the future effect of the envisaged reform measures. Using Sector Scenario Assessment, a method based on "business as usual" and "sustainable ecosystem management" scenarios comparison, this paper presents the value of provisioning services of the forestry sector. The analysis concluded that continuing to implement present policies and practices will create important economic losses on long term.*

Key words: *forestry, ecosystem services, provisioning, Moldova.*

1. Introduction

Moldova's forestry sector represents a small portion of the Gross Domestic Product (GDP) – 0.3% [12] but it is a priority in terms of development considering the social, economic and environmental implications for the country [12], [13]. Only about 13 percent of the country's territory is covered by forests [14]. The limited forest area has direct impact on soil degradation, desertification, biodiversity deterioration and water resources [12]. The forest area of 374.6 thousand ha is owned by state – 87.2 % - local public authorities (LPAs) – 12.2%

and very few private owners – 0.6% [4].

All the forests in Republic of Moldova are included into protection forests category. The most restrictive regime belongs to a functional group including natural reserves – scientific forests [4]. The total standing volume is 46 million cubic meters [4], [5] and the average growth is estimated at 3.3 cubic meters/year.

State forests in the Republic of Moldova are managed by Moldsilva Agency (MA) which is also the central public authority in charge of policy making and regulatory attributes [16]. This overlapping of attributes is subject to an institutional reform strategy, on the way to approval

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[16]. According to the Forest Code [3], LPAs have certain obligations regarding their own forest management. There is no very precise separation of attributes between LPAs and MA as long as the regulatory framework states that they have to cooperate towards the maintenance of community forest vegetation without clearly describing the envisaged cooperation [3].

Annual allowable cut represents around 40% of the annual increment [4] (in comparison with the European average that is 60% [5]). The annual harvested quantities are, in the last years at the level of the annual allowable cut [4], [17].

The officially reported volumes of illegal harvesting are relatively small, representing less than 1% of annual harvesting for those forests managed by MA [4], [7], [17]. However, reports and analyses conducted under the ENPI FLEG on illegal logging [7] and wood consumption show a quick different and indeed alarming picture. The annual estimated use of fuel wood is 1.039 million m³ or three times the reported sale of firewood by MA which manages. The total estimated consumption of fuel wood and timber used for energy is 1.078 million m³ and this represents 90% of the estimated annual increment of MA managed forests [7]. Based on ENPI FLEG survey results [7], 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 fuel wood but also a reduction in biodiversity and increases in deforestation / degraded forests which in turn will facilitate further land degradation and erosion.

Currently, the system of protected areas (PAs) in Moldova covers 191,000 ha (or 5.6 % of the country) [15]. Four of the five largest Scientific Reserves — as well as Orhei National Park, are under the direct operational management of MA. [17].

The above presented situation of the forestry sector in the Republic of Moldova justifies the initiatives for institutional and administrative reform of the sector. The frame created by the ecosystem services (ES) valuation initiatives [14] have the merit of providing data to guide the reform process. By analysing the values of the provisioning services of the forest ES, the present paper demonstrates that the wood harvesting and non-timber forest products (NTFP) collection — the most important activities within the sector — can be economically counted by the existing markets, and a sustainable manner of direct use of forest products have significant benefits for national economy and human wellbeing. Besides the contributions evaluated by this paper, the forest ecosystems also provide important regulating, cultural and supporting services [2] that are not considered in this paper.

2. Material and method

The study involved analysis of provisioning forest ES values at national level. The data processed in the paper represents a small portion of the data collected in a bigger study [11] done within the project *GEF/UNDP BD-EA National Biodiversity Planning to Support the implementation of the CBD 2011-2020 Strategic Plan in Republic of Moldova*.

The Sector Scenario Analysis (SSA) was applied till now in several international studies [2, 6] but the guidebook describing the methodology is recently published [1]. The central part of this approach is the comparison between two scenarios, Business as Usual (BAU) and Sustainable Ecosystem Management (SEM), to capture, in monetary terms, the contribution of ecosystem services to sectors of the economy.

Under BAU scenario wood harvesting will continue to support consumption at

present level. Biodiversity losses may occur in some areas, while the protected forests surfaces stay at the same level. Ineffective legal framework will result in ongoing illegal logging. Unsustainable cuttings every year will get to decrease in the annual allowable cut, causing even an increase in illegal logging. Under BAU, potential of NTFP will decrease due to ecosystem degradation.

BAU and SEM scenarios description

Table 1

Indicators	BAU	SEM
Harvested quantities	Decreasing from year 5 with 3 or 5% /year till year 25	Decreasing from year 5 with 3 or 5% /year till year 20
Harvested quantities from PAs	Decreasing from year 5 with 3 or 5% /year till year 20	Decreasing from year 5 with 20 or 15% /year till year 20
Illegal logging	Increasing 15%/year from year 5 to year 20	Decreasing to almost nothing in 25 years
Surface of forests	Decreasing 2-3% /year due to improper management of LPAs forests	Increasing with 2 % /year from year 11 to year 25
Surface of scientific forests	No change	Increasing up to 10%/year from year 5 to year 20
% of income to budget from forestry and NTFP	No change	Increase 0.5%/ year from year 6 to year 25
% added value on the economic chain	No change	Increase 0.5%/ year from year 6 to year 25
Value for NTFP	Decreasing from year 6 to year 20	Increasing 6%/year from year 6 to Year 20

The SEM scenario would involve less emphasis on wood production supported by: (i) an expansion of scientific forests on account of their biodiversity significance; (ii) decrease in illegal logging while important quantities are harvested legally from the unscientific forests, at a reasonable percent of the annual increment and, (iii) optimal harvesting of NTFPs. Better enforcement of more effective forestry specific regulations will lead to a reduction in illegal logging (Table 1).

The BAU and SEM scenarios were initially designed by the authors and intensively discussed during two workshops with a wide participation of sector stakeholders: MA, Institute of Forest Research and Management Planning, Non-Governmental Organisations, Academy of Science of Republic of Moldova, Ministry of Environment, Ministry of Economy, Ministry of Agriculture and Food Industry,

managers of Natural Reserves, etc.

In Moldova almost all timber harvested is used for fuel and there is a very high reliance on fuel of heating and cooking among the rural population [4], [7]. Thus, the forests have a direct impact on local livelihoods and economies and human wellbeing [13]. The SEM model show that supply of fuel wood meets demand and is increasingly legally organised, with revenues directed to improved forest management and extension of the forest.

Calculations for baseline value considered the following direct values: quantities of wood and NTFP harvested, prices for those products, illegal cutting, surfaces of forest and PAs, incomes to budget from forestry, value added by the economic chains. The data sources were publicly available documents: reports made by international organizations [11-13], by national agencies and offices for

statistics [4], [7], [10], [16], [17] or other literature sources [3], [5]. The study relies on the following valuation approaches: market price approach [8] and productivity approach [9].

3. Results and discussion

The scenario models are highly speculative, due to a lack of both

biophysical and economic data. The limited use of benefit transfer techniques is still advocating for the precision of the valuation. Also, the way the BAU and SEM scenarios were designed as well as the calculation itself were oriented towards a conservative approach, real and comprehensive data may thus even deepen the conclusions.



Fig. 1. 2012 baseline value and beneficiaries distribution (mill USD)

The value of forest provisioning ecosystem services in terms of direct values is \$28.3 million in 2012 (Figure 1).

The quantity of harvested wood falls over time and the limited use of NFTP determine a decrease in forest sector value under BAU relative to SEM, besides the continuation of the big amount of illegal logging and small surfaces of scientific forests. However, this decrease is not severe, assuming that other forest regulating services continue to be provided. The present estimated value of ecosystems for the BAU scenario, for a period of 25 years and a discount rate of 10% is \$579.4 million.

SEM is characterized by a severe decrease in economic values, after a stagnant period of 5-6 years due to the increase of protected forest surface, reduction in illegal logging being not compensated by the harvested volume.

After 20 years, the economic value of provisioning forest ES increases, recovering the value lost through the reduction in wood harvesting, due to the increased value of NFTP, decrease in illegal logging and increase in forest surface. The rate of growth slows as optimal NFTP harvesting rates are reached, and become constant. The PV (10% rate over 25 years) for forest ecosystems is estimated at \$578.8 million.

Figure 2 shows the scenarios comparison between the annual values of forest ecosystem provisioning services, most important being the fact that, in the long run, the implementation of SEM scenario brings to a constant value over time – reflecting the sustainable approach - while BAU scenario is obviously leading to decreasing value.

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 value becomes constant through time reflecting the sustainable management of the forests.

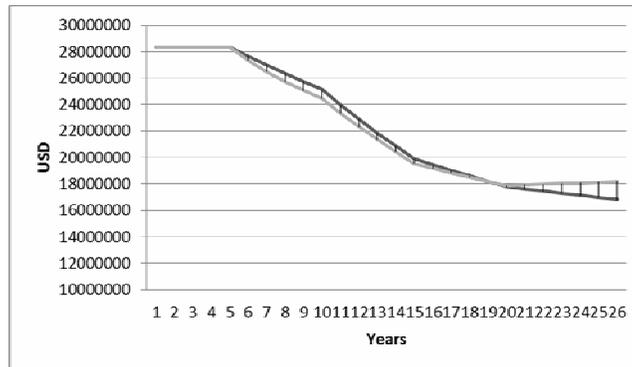


Fig.2. *The ecosystems' value to Forestry under BAU and SEM*

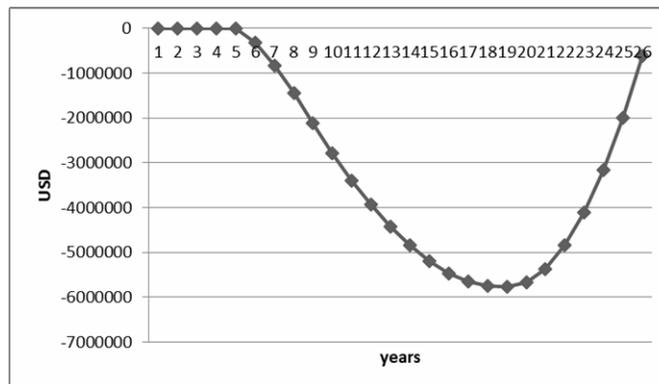


Fig.3. *Cumulative added value of SEM over BAU*

BAU values are superior to SEM values over the 25 year time horizon, generating an additional \$0.6 million (Figure 3). We may consider that this loss is rather small if the regulating and supporting services of the forest are considered.

4. Conclusion

As part of a sustainable management strategy for the forest areas, NTFPs management and harvesting should be developed. This will require undertaking more detailed studies of their capacity and market potential.

At this moment, the annual allowable cut is theoretically under the total increment of the Moldavian forests due to the conservative way the management plans are elaborated. In practice, the total fuel wood consumption is overpassing the total quantities of legally harvested wood by almost 80% [7]. This is a serious indicator that illegal logging may be involved. The envisaged solution for this may be a temporary increase of the allowable so that the needed quantities of fuel wood can enter the market. The measure must be doubled by more effective law enforcement to eradicate the illegal

logging. Thus, the forest ecosystems can provide the needed fuel, while the state is cashing its taxes and the management of forest ecosystem is sustainable.

Acknowledgements

The authors would like to thank the team of the GEF/UNDP BD-EA project *National Biodiversity Planning to Support the implementation of the CBD 2011-2020 Strategic Plan in Republic of Moldova*. Special mention must be made for Alexandru Teleuta, Aurel Lozan, Alexandru Zubarev and Mike Appleton.

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