Dissemination Note Series

Romania: Toward a Low Carbon and Climate Resilient Economy

Forestry Sector Analysis

Sector background

Forests provide a substantial contribution to mitigation in Romania by sequestering carbon, helping to counter carbon emissions from other sectors in the economy.

Forests are important in removing greenhouse gas emissions from the atmosphere, thus contributing to mitigation. Romania has the largest remaining tract of contiguous natural and naturally-regenerated forest in Europe. The country's Land Use, Land Use Change and Forestry (LULUCF) sector contributes significantly to emission reductions, mostly from forestry.

In Romania, the land use, land use change and forestry (LULUCF) sector is removing 27 percent of emissions produced by other sectors. Forestry can provide additional abatement of 1,828 kt CO_2 per year at the total cost of €115 million during the timeframe 2015-2050, equaling just 0.002 percent of GDP.

When benefits are taken into account, the total related costs becomes negative, equaling -€86 million.

LULUCF has been removing an average of 27 percent of emissions produced by other sectors each year during the timeframe 2000 to 2011, and 24 percent during the period from 1990 to 1999. At the same time, Romania's forests are being negatively affected by a changing climate, and adaptation efforts are needed to preserve them and their ability to sequester carbon.

Changes in precipitation and temperature in particular are causing the drying of forests, reducing forest growth, and increasing biological risks including pest infestation, which can cause serious damage. Changes in climate variables also alter where tree species are most productive, lowering the productivity of species that have not migrated as a result of such changes and requiring adjustments to management approaches.

Sustainable forest management is challenged by fragmented ownership and insufficient financial resources in particular.

Romania's transition to a market economy generated significant changes in the forest sector. The restitution process for forest land modified the structure of forest land ownership. Holdings are now predominantly small, and the forest system is fragmented, making the task of sustainable forest management challenging. There is no cadaster of forest lands, and the parcels' ownership, as well as the boundaries between forest parcels, is often unclear to forest authorities. Incentives are not aligned for owners of small private holdings to comply with the forest regulatory framework. This explains the poor performance of afforestation programs in properly compensating the owners. Limited road accessibility is another constraint to forest management and, as a result, harvesting levels in inaccessible areas are below the recommendations of forest management plans, while accessible forest stands are over harvested. Due to a lack of access, fire and pest control are inefficient.

A lack of adequate financial resources, especially those that assist smallholders, is also a barrier to forest management actions such as afforestation of agricultural land and the establishment of forest belts.

Methodology

A summary of key existing analytic studies, and the construction of a marginal abatement cost curve for mitigation actions in the forestry sector, was the basis for identifying key adaptation and mitigation measures for Romania's forests.

The Joint Research Center of the European Commission and the Romanian Forest Research and Management Institute (Institutul de Cercetări și Amenajări Silvice, ICAS) undertook a modeling exercise in 2012, constructing a baseline, or business-as-usual, scenario and three green scenarios related to forestry.

The baseline included shifting trees to older age classes under current forest management norms and accessibility conditions, which in turn will reduce carbon sequestration.

A second study, led by ICAS, examines GHG projections under three scenarios, increasing intervention from Scenario 1 to Scenario 3.

- Scenario 1 assumes the current resource management practices for all types of lands and afforestation of 2,000 ha annually.
- Scenario 2 includes measures to improve land use by returning to pre-1989 levels of annual wood harvesting in areas with prior excessive logging, afforesting degraded lands at the rate of 5,000 ha per year, and implementing 'no-till' practices on 30 percent of the arable land annually, in rotation.
- Scenario 3 includes measures to improve land use and additional financial incentives for specific public goods services, including measures to increase the annual harvest of wood to pre-1989 levels through the intensification of forest management, afforestation of degraded lands at a rate of 10,000 ha annually, creation of woody biomass from fast-growing crops at a rate of 5,000 ha per year, implementation of "no-till" practices for 40 percent of the area of arable land per year, in rotation, and increasing the protected nature conservation and biodiversity protection area.

In addition to the national and international analytic exercises, a marginal abatement cost curve (MACC) was estimated for three measures: afforestation, sustainable management of protection forests, and sustainable management of production forests.

The measures examined are presented according to two parameters of the MACC:

- potential mitigation impact (kt of CO_2e of emissions abated)
- the unit cost of abatement (cost per ton of CO_2e abated)[1].

The estimates were made on the basis of recent local data, collected and validated by Romanian experts[2]. The afforestation measure addresses the problem of the decrease in forested land area and on-going land degradation, and focuses on degraded lands.

This focus means higher costs, but higher long-term benefits. The measure of sustainable management of production forests is based on evidence that shorter rotations mean less forests disturbances (e.g., risks of pests, fires, etc.), hence more valuable and healthy trees for harvest and a better opportunity to lock-up CO_2 in the end products from the timber – e.g., wooden construction materials.

[1] *The discount rate used is three percent, as a social discount rate was considered appropriate for this analysis.*
[2] *The estimates were made by Dr. Marian Dragoi, University of Suceava, Romania, in coordination with other local experts.*

The measure was estimated for Norway spruce. Shortening its rotation from 110 to 100 years was assumed to result in a wood yield increase of 10 percent (a conservative estimate); it was also assumed that Natura 2000 management plans would be enforced, resulting in compulsory environmentally-friendly harvesting operations, the reduction of timber harvested as salvage product, decreased damage to remnant trees, and less salvage products over the long run.

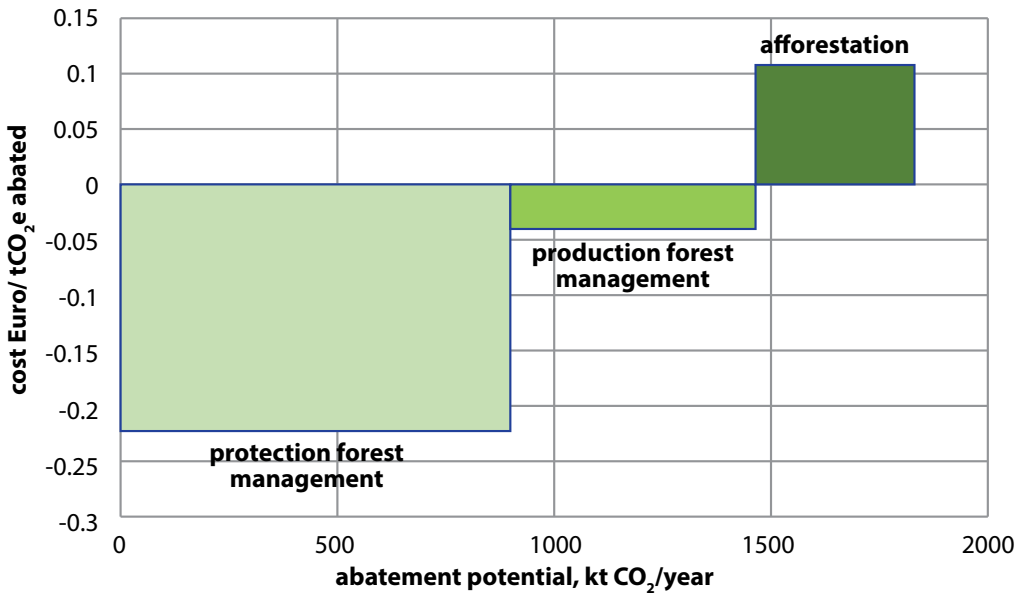
Findings

Analysis of adaptation needs and mitigation possibilities found that forestry could provide cost-efficient abatement for Romania of an estimated 1,828 kt CO_2 per year in 2050.

Existing studies conclude that for the timeframe considered (2015-2030), the quantity of CO_2 removals is highest under the most aggressive green scenario (Scenario 3). Additional evidence from forests elsewhere, with conditions similar to Romania, indicate that sustainable forest management enforced on both public and private lands and ensuring biomass regeneration and preventing degradation, can optimize emissions reduction. The outcomes of the marginal abatement cost curve (MACC) analysis show that the proposed measures provide a significant potential abatement level. These outcomes are presented in Figure 1, which shows that during the year 2050, the final year of the projected period, 1,828 ktCO_2 will be abated.

Figure 1. The proposed forestry measures are highly cost efficient and provide significant abatement potential

Marginal abatement cost curve for forestry



Source: Staff calculations based on estimates and research provided by Dr. Marian Dragoi, University of Suceava, Romania

Financing needs for the three priority measures— afforestation, sustainable management of protection forests, and sustainable management of production forests—were evaluated.

The measures were deemed highly cost efficient: two of them–protection forest management and production forest management–have positive net benefits (negative net costs), and the third measure–afforestation–has negligible positive net costs. The total discounted net cost of all three measures for the period 2015-2050 is negative (provides higher revenue than required costs) and equals -€86 million. If benefits are not taken into account, the cost is €115 million for the same period, or just 0.002 percent of GDP.

The schedule of costs requires approximately equal amounts of funding annually. The benefits, however, appear later in the projected period, mostly after 2030, because forestry measures require time to produce benefits.

Conclusions and Recommendations

Recommendations stress the importance of sustainable forest management for Romania and the EU's desirability to move rapidly towards defining the rules (including the country-level targets and flexibility rules) for LULUCF-based mitigation within its 2030 Framework.

These actions would enable Romania to use forests as an important component of the country's mitigation strategy. Forestry in Romania is a key sector for mitigating climate change, as it removes 27 percent of GHG emissions annually. Forest-based mitigation measures can include conserving existing CO_2 sinks, enhancing carbon sinks, and reducing the trade-off between sinks, as well as tangible and intangible benefits from other land uses.

Adaptation measures in forestry are critical to enhance the forests' mitigation capacity. These measures also benefit other sectors, in particular agriculture and energy.

Romania should promote afforestation outside of forests and invest in afforestation of degraded lands, create forest belts, and enhance the management of forests in watersheds to reduce flooding.

Policy measures that mitigate climate change and contribute to growth are critical, as is capacity building.

Policies related to reducing forest fragmentation should be implemented, in particular those aimed at engaging smallholders in sustainable forest management activities. Capacity for monitoring the contribution of forest management to mitigation should also be improved.

Creating and implementing a transparent and updated monitoring system for CO_2 removal, together with a review of the modeling and analysis, would help provide more accurate assessments of the contribution of forests to climate change mitigation. The system for forest fire detection, monitoring, and management should be upgraded, and it is critical to improve road accessibility.

To achieve this, funding should be provided for the creation of forest roads based on the principles of conservation of natural resources and biodiversity, in full accordance with economic development priorities, including the contribution to climate change mitigation.

A greener path for forests will require additional public spending.

Financial support to landholders, especially private ones and in particular small landholders, will be necessary. This could be provided in the form of public investments or financial support to buffer upfront costs associated with generating a larger public benefit. Other financing needs will fall primarily on the private sector, including those of forest roads. Financing could be met by mainstreaming some of the necessary forestry actions into other EU-funded programs (such as ecological reconstruction, small and medium enterprises, education and extension, and other aspects of the NRDP), prioritizing where interventions are financed, and making the sustainable management of forests profitable by reforming the policy and regulatory requirements for forest management to help bring in private funds.

Financing needs for all three priority measures evaluated--afforestation, sustainable management of protection forests, and sustainable management of production forests--equal €115 million (discounted[3]) for the period 2015-2050 or just 0.002 percent of GDP.

When benefits are taken into account, the total discounted net cost is a negative €86 million.

[3] *At a three percent discount rate.*

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