Universitatea *Transilvania* din Braşov

HABILITATION THESIS
SUMMARY

Title: Ecosystem Services Valuation using Targeted Scenario Analysis – Ecosystem Services Values for Decision Making

Domain: Forestry

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The habilitation thesis presents a part of the results of the research activity undertaken in the area of forestry after the public defense of the PhD thesis *The fundament of the degraded forest stands ecological reconstruction in the Covurlui plateau*, in 2006, within Transilvania University of Brașov. The habilitation thesis is structured as follows: summary, professional and scientific achievements, career development plan and bibliography.

Starting with the 6th decade of the XX century the implementation of the ecosystem services concept has represented a special interest in the area of environment economics. This concept, very quickly adopted by the scientist, has become an important frame for understanding the natural capital as a societal and economic asset. Defined as the benefits people obtain from ecosystems, ecosystem services has become increasingly significant both in the research and decision making, this fact being witnessed by the publication of the Millennium Ecosystem Assessment Report, a monumental work involving over 1300 scientists. The main challenge for implementing the ecosystem service approach is the evaluation of these services based on the linkage between them and the human wellbeing. Statistics and evaluations elaborated for informing the decision making have conventionally taken into consideration only of those values for which there is a clear market and price. Ecosystem services approach explicitly recognizes that many ecosystem services are not priced or marketed, the values of them being indirect values. The solution that has been found is taking into consideration of the full range of economically important services associated with ecosystems, under the framework of Total Economic Value.

After several decades of efforts and innovations in the area of ecosystem services evaluation, the general opinion is that the results of ecosystem services valuation didn't met the initial expectations regarding its applicability in decision making process. This context is the one that determined the design and use of the Target Scenario Analysis (TSA) as an innovative approach to capturing and presenting ecosystem services values for decision making and thus to create a closer connection between the needs of the decision making process and the efforts of the evaluation. The methodology is based on comparing two management scenarios, Business As Usual (BAU) and Sustainable Ecosystem Management (SEM). They are to be designed by consulting with stakeholders involved in ecosystem management, research and regulating or are main beneficiaries of ecosystem services.

The use of TSA in Romania, described in chapter 3 of the habilitation thesis, meant ecosystem services evaluation for 5 national and natural parks. The research was done under the frame of the GEF-UNDP project *Improving the Financial Sustainability of the Carpathian System of Protected Areas*. It aims to explore whether long run benefits can be obtained through the sustainable management of forest ecosystems within protected areas when compared to immediate benefits of doing business as usual. Total economic value of forest ecosystems services is estimated using commonly used valuation techniques under the innovative umbrella of the TSA methodology, introducing sectorial focus, alternative management scenarios and time dimension to the evaluation process. The economic indicators determined by using the models defined by these scenarios for the next 30 years, results of a complex data collection process and application of appropriate valuation techniques show that, after 30 years, forestry activities under SEM exceed the values of BAU scenario in terms of added value to the economy. By focusing not only on forestry related but also on other sectors related ecosystem services, the research may open doors for considering more complex incentive/financing mechanisms that helps secure biodiversity and ecosystem services more broadly.

Second phase implementation of the ENPI-FLEG project in the Republic of Moldova created the opportunity to estimate the value of forest ecosystem services in this country, using the same methodology – TSA. Being previously used with very good results in Moldova in 2013 (the comparative evaluation of the SEM and BAU scenarios, done during the elaboration of the National Biodiversity Conservation Strategy, provided the necessary arguments for official

approval of the strategy budget) the method based on the data collection and analysis using commonly used ecosystem services valuation techniques, within the frame of the BAU and SEM scenarios. Different from the studies done in Romania, the Moldova research allowed direct data collection by questionnaires implementation for estimating the forest resources dependency of the rural population in the Republic of Moldova. Chapter 4 presents the results of the estimation of the total economic value of the forest ecosystems services. The main characteristics of the forestry sector in Moldova are presented along with the results of the forest resources dependency assessment and the results of the evaluation of ecosystem services in both SEM and BAU scenarios in the following economic sectors: tourism, agriculture, water management, natural disasters and forestry. The conclusions show that forest ecosystems provide impressive economic values for the analyzed sectors. Forest ecosystem services accrue to multiple sectors, having a substantial multiplier economic effect. There remain untapped opportunities to increase the levels of revenues generated from forest ecosystem services, while well managed forest ecosystems may reduce significantly the damages produced by floods, soil erosion and landslides. The conclusions of the research are also formulated into recommendations regarding the forest ecosystem management and the necessary changes for the institutional and regulatory reform of the forestry sector in the Republic of Moldova.

The habilitation thesis also presents, based on the described research (but not only), the research topics and directions envisaged by the author, as well as a plan for academic career development, all of them into the section B -ii of the paper.