

Causes of anthropogenic pressure on forest systems in Romania

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INTRODUCTION

Human activities have a strong impact on the elements of the geographical environment. The tropical and equatorial environments, the environment of the boreal forests, but also that of the temperate forests are in continuous transformation. Forests in Romania are ecosystems severely affected by uncontrolled deforestation even in protected areas. Forest cover declined between 2000-2010 by 1.3% but the old forest, especially from the Carpathians, are situated in protected areas (Knorn, 2013; Drăghici et al. 2016; Pintilii et al. 2019).

From 2001 to 2019 deforestation represented the dominant driver of tree cover loss in Romania with 0,17%. The top counties regarding tree cover loss in Romania between 2001-2020 were Suceava (57.500 ha), Harghita (38800 ha), Maramureș (26000 ha) and Cluj (19700 ha) (Hansen et al. 2013).

In this article, we wanted to analyze the impact of anthropogenic activities in Suceava County, which is facing the highest deforestation rate in Romania.

MATERIALS & METHODS

Study area: **Suceava County** is located in the northern part of Romania, in the North-East Development Region (Figure 1a). It has an area of 8553.5 km², which represents 3.6% of Romania's area. It is one of the largest counties in Romania, with 16 cities (including Suceava) and 114 administrative-territorial units. This is the richest county in forest resources in Romania (approximately 7% of the entire county area and 48.1% of the country's area - 411,115 ha) (Figure 1b).

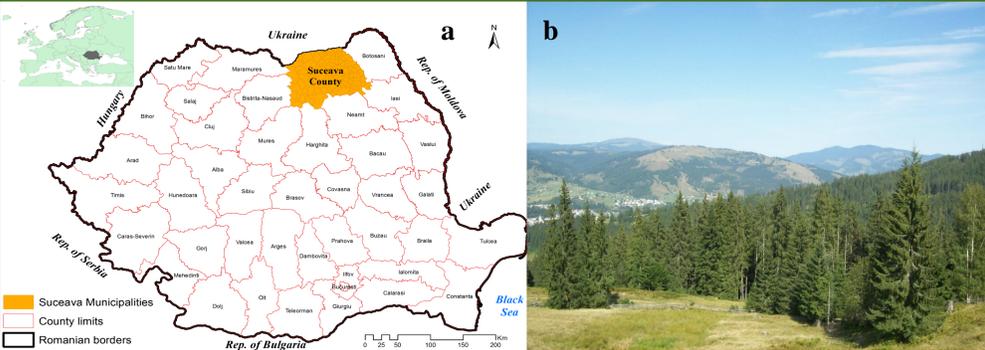


Figure 1 – a. Localization of Suceava County in Romania b. View of mixed forest (coniferous and deciduous) and Dornelor Depression

The analysis of deforestation in Suceava County considered the **evolution of deforested areas** in Suceava County. The database used in this article was made up of Landsat-7 Enhanced Thematic Mapper Plus (Landsat-7 ETM+) images from Global Forest Change (GFC) from the University of Maryland (Hansen et al. 2013).

The link between the socio-economic impact and the deforested areas was made by analysing the economic activities corresponding to the economic activities NACE code: letter A - Agriculture, forestry, and fishing: forestry exploitation and processing activities, for the period 2001-2016.

RESULTS & DISCUSSION

The deforestation situation for the period 2001-2016 (Figure 2) highlights the presence of five distinct intervals, noting very high rates of deforestation in the western communes (Carpathian area) and lower rates in the eastern part of the county.

Communes with high deforested areas (> 1,500 ha) are those that have such resources and are in the mountainous area, characterized by a variety of forests, from deciduous forests to coniferous and mixed forests.

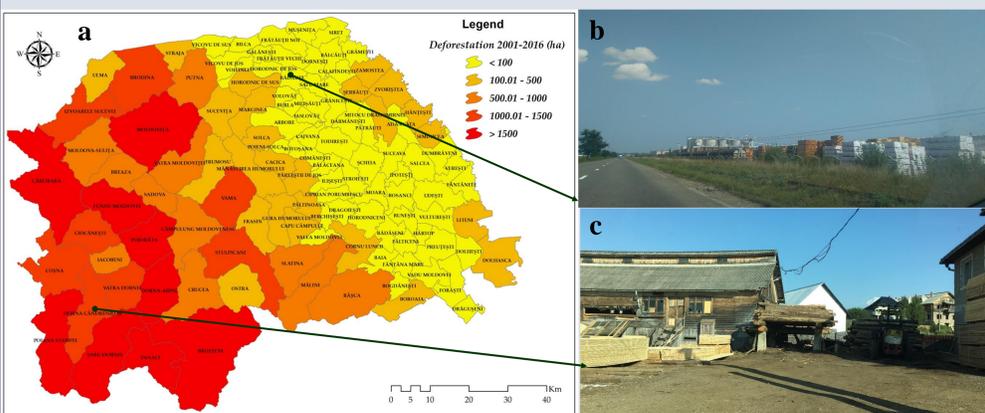


Figure 2 - a. Deforestation rates in the period 2001-2016 in Suceava County, marked by shades from dark red, mainly in the western part of the county (most deforested), to yellow, in the eastern part of the county (least deforested); b. Schweighofer - Rădăuți; c. Wood processing - Poiana Negrii.

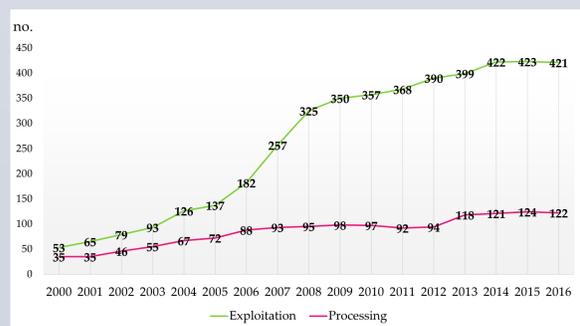


Figure 3 - Evolution of the number of companies in the period 2000-2016 at the level of Suceava County

The evolution of economic indicators in the forestry sector was analyzed considering the division into two main activities: logging and processing activities.

Regarding the evolution of the **number of companies in the exploitation activities**, there is a general upward trend, when there are 182 companies in 2006 and 257 companies in 2007, compared to 2005, when there were 137 companies. The number of companies in processing activities is generally low. There are 35 companies registered in 2000, with gradual increases from one year to another, and in 2016 are 122 companies (Figure 3).

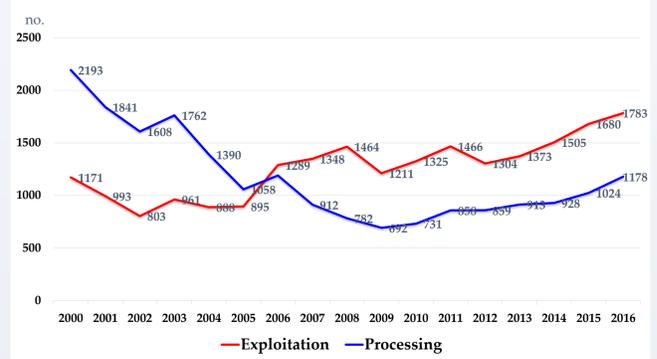


Figure 4 - Evolution of the number of employees in the period 2000-2016 at the level of Suceava County

The evolution of the number of employees in forestry activities notes a trend of increasing the **number of employees** in the logging activity (the largest number of employees was present in 2016 - 1783 employees), and a gradual decrease in the case of processing activities, in the period 2005-2014 (Figure 4).

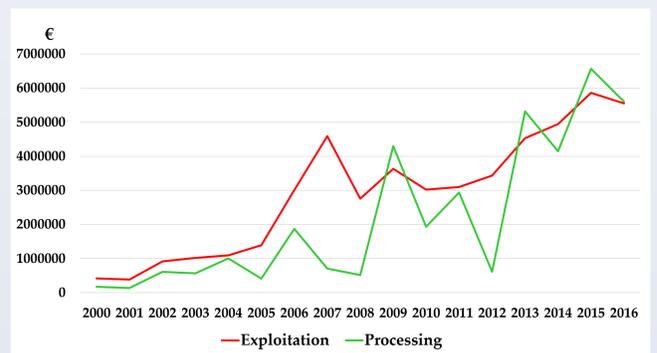


Figure 5 - Evolution of profit values in the period 2000-2016 at the level of Suceava County

Profit values are materialized by a substantial increase in the case of logging (the highest profits were recorded in 2007 - 4588483 € and in 2015 - 5861826 €).

There is a close link between the high values of profit and the deforestation rate in the county, so that in the years when the deforestation rate was high, the highest values of profit are observed (as in 2007 and 2015).

The profit from the processing activities has considerable fluctuations from one year to another, the highest values are noticed in 2009 - 4297353 €, 2013 - 5319290 € and 2015 - 6566584 €.

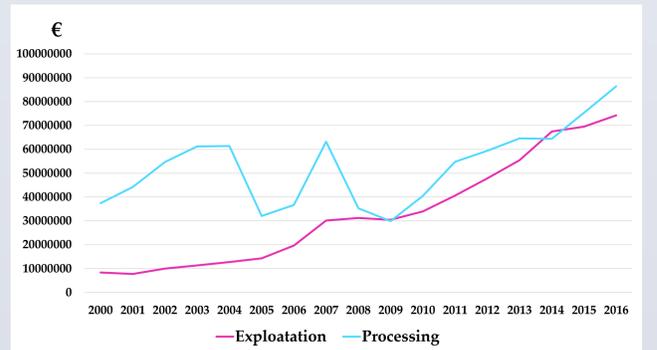


Figure 5 - Evolution of turnover values in the period 2000-2016 at the level of Suceava County

Turnover values (Figure 5) show an upward trend, both in the case of logging and forestry activities. In the case of forestry processing activities, oscillations can be observed in the period 2000-2008, following a gradual increase (the highest value of turnover is recorded in 2016 - 86425685 €).

Suceava County is facing the largest deforested area among all Romanian counties (57500 ha). This aspect is highlighted especially in the **mountainous areas** (Cărlibaba - 6080 ha, Broșteni - 4070 ha, Poiana Stampei - 3880 ha). The increase of deforested areas has led to an increase in the number of companies (especially after 2008). The number of employees has seen an increase in the number of people engaged in activities related to timber exploitation compared to forestry processing activities.

The analysis of deforested areas in Suceava County for the period 2001-2016 **highlighted the accelerated growth of deforested areas**, the presence of small "family" businesses with wood that could be processed to obtain a higher profit, high incidence of floods and landslides, depopulation of mountain areas affected by deforestation.

CONCLUSIONS

The analysis of the forest areas in Suceava County, for the period 2000-2016 **highlighted important changes, especially in terms of deforestation, but also afforestation.**

The localities in Suceava County, where there are large areas of forest, are limited to the **Carpathian mountain area** (Broșteni, Moldovița and Cărlibaba localities), an area characterized by a **high degree of afforestation, and with a superior quality wood.**

Forest exploitation and processing activities have a synergistic action upon environment, and they can have a waterfall effect by affecting all components of the forest system. In the period 2001 - 2016 it is observed that the forest exploitation and processing activities experienced significant increases, especially for the wood exploitation activities.

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