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CONVERSION OF PASTURELANDS INTO COMMUNITY FORESTS: TECHNICAL AND ADMINISTRATIVE IMPLICATIONS - THE CASE OF INEU (BIHOR COUNTY, ROMANIA)

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Abstract

The paper presents the process of converting former communal pastureland into a community forest, implemented in Ineu Commune, Bihor County, Romania. The study analyzes the technical aspects related to the establishment and early development of a black walnut (Juglans nigra) plantation, as well as the administrative and legislative framework that enabled the land-use conversion. The reconversion process was based on local council decisions adopted in accordance with the provisions of the Forest Code (Law No. 331/2024) and the Administrative Code (Government Emergency Ordinance No. 57/2019), which regulate property transfer and the management of local assets. The analysis focused on the survival rate and health condition of the planted seedlings, in correlation with the integration of the newly established stand into the existing forest fund. The results provide an applied perspective on how local administrative units can rehabilitate degraded lands through community afforestation projects, in line with the objectives of the European Green Deal and the European Union Forest Strategy 2030.

Key words*: afforestation, health status, local administration, seedling height, survival rate.*

INTRODUCTION

The conversion of agricultural land, particularly pasturelands, into forested areas has become an increasingly significant direction within environmental and sustainable development policies, both at the European and national levels. This transformation aims not only to expand the national forest fund but also to ecologically value low-productivity lands, often owned by local administrative units. In the current context of climate change, afforestation of such areas enhances carbon sequestration capacity, reduces soil erosion, and improves local microclimates, while simultaneously providing educational and recreational opportunities for local communities (FAO, 2022).

At the European level, the EU Forest Strategy for 2030, as part of the European Green Deal, promotes afforestation and ecological reconversion of degraded lands, with the goal of planting three billion trees by 2030 (European Commission, 2021; European Parliament, 2022). In Romania, this orientation is supported by the Forest Code (Law No. 331/2024), which defines the legal regime of forests and simplifies the procedures for integrating new plantations into the national forest fund, as well as by the Pasture Law (Law No. 214/2011), which allows the conversion of unproductive pastures into forests under specific technical and administrative conditions established by environmental and agricultural authorities (Government of Romania, 2011, 2024).

Such initiatives possess a dual value: on the one hand, an ecological dimension-through landscape restoration and biodiversity enhancement-and on the other, a social and administrative dimension-through the involvement of local authorities, educational institutions, and citizens. In Central and Eastern Europe, numerous communities have implemented similar land-use conversion models, reporting positive results regarding soil stability, reduced desertification risks, and reinforcement of local natural capital (FAO, 2022; European Union, 2024). In Romania, these projects are becoming increasingly common, supported by national and European programs dedicated to afforesting degraded lands and expanding local green spaces (MADR, 2024; Ineu Local Council, 2023).

The conversion of a communal pasture into a community forest, as analyzed in this study,

represents a concrete example of implementing these policies, in which the local public administration, academic institutions, and civil society collaborated to transform a low-value agricultural land into a multifunctional green space with ecological, educational, and social purposes, in full accordance with the principles of sustainable development.

In the North-West Region of Romania, counties such as Bihor comprise agricultural land in which approximately 56.88% of holdings make use of pasture (Pop et al., 2023).

According to the Administrative Code (Government Emergency Ordinance No. 57/2019), the Local Council has the authority to decide on changes in the legal regime of lands from public to private ownership within the administrative unit, which enabled the lawful conversion of the analyzed site from communal pasture to community forest.

The present paper focuses on a 0.6-hectare area planted with black walnut (*Juglans nigra* L.), which forms part of a 1-hectare experimental plantation established for the creation of a community forest in Ineu Commune, Bihor County. This research is part of a broader study involving three forest species-black walnut (*Juglans nigra* L.), northern red oak (*Quercus rubra* L.), and sessile oak [*Quercus petraea* (Matt.) Liebl.]-selected for their ecological potential and adaptability to local site conditions. The land, formerly used as communal pasture, was reconverted for ecological, educational, and recreational purposes. The paper presents the results concerning the initial establishment phase, growth performance, and health condition of black walnut seedlings under the specific site conditions of the study area.

The planting works were implemented through a broad partnership between the local public administration, academia, and the local community. The Ineu Town Hall provided logistical coordination and administrative support, facilitating on-site activities and mobilizing local resources. The planting material was supplied by an authorized forest nursery, in compliance with current technical standards. The planting layout and spatial design were developed under the supervision of academic staff and forestry specialists from the University of Oradea, with the participation of forestry students, who contributed to both the technical execution and the initial monitoring activities. The planting operation itself involved employees of local private companies, social assistance beneficiaries, pupils from local schools, and community volunteers-representing a successful example of inter-institutional cooperation among the local administration, the educational sector, and private stakeholders. This participatory approach strengthened the project's social dimension, raised public awareness of environmental protection, and reinforced community cohesion at the local level.

Study Objectives

The objectives of the study were as follows:

• To document the technical, administrative, and legal process of converting a communal pasture into a community forest, in accordance with the provisions of the new Forest Code and the local regulatory framework.

• To evaluate the dendrometric characteristics and health condition of black walnut (*Juglans nigra* L.) seedlings over an area of 0.6 hectares, in order to determine the survival rate, annual growth increments, and plantation uniformity.

• To formulate a replicable model for other local administrative units interested in the ecological reconversion of degraded or underutilized lands, emphasizing the role of local public administration in initiating and managing such projects.

Local Land Use and Forestry Context

Ineu Commune is located in the northwestern part of Romania, in Bihor County, approximately 10 km east of the city of Oradea, as part of the Oradea Metropolitan Area. The total area of the administrative unit is approximately 4,951 hectares, of which more than 58% is agricultural land. Pastures occupy around 2,002 hectares, representing about 23% of the agricultural surface (National Institute of Statistics, 2024).

The geographical coordinates of the site are 47°06′05″N, 22°06′10″E (Figure 1).

In recent years, a gradual trend of functional reconversion of communal pastures has been observed, either through land consolidation or the implementation of projects with community and ecological purposes.

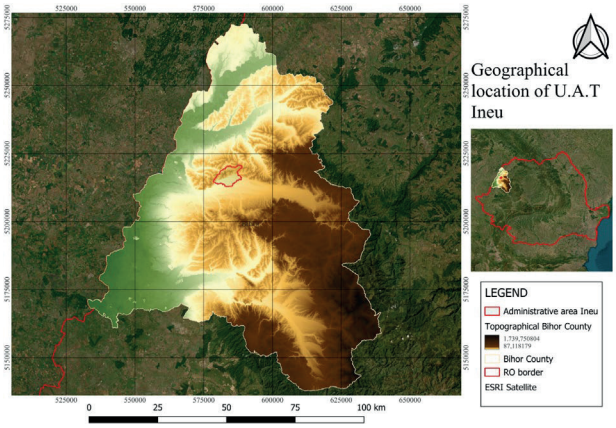


Figure 1. Geographical location of Bihor County and Ineu Commune

At present, the commune manages its own forest areas (administered within Production Unit 1, e.g., compartment 46) and borders forests belonging to the National Forest Administration - Romsilva, Oradea Forest District (Production Unit 3, Ineu), including:

• subcompartment 48A - sessile oak seed reserve (composition 8GO-1CE-1FA; GO – sessile oak, CE – Turkey oak (*Quercus cerris* L.) and FA – beech (*Fagus sylvatica* L.), respectively) and

• 48B – mixed forest (composition 5CA-1CE-1GO-3TE; CA - hornbeam (*Carpinus betulus* L.), CE - Turkey oak, GO - sessile oak and TE - linden (*Tilia* sp.), respectively).

According to the Sustainable Development Strategy of Ineu Commune 2021-2027, a significant share of the commune's total area is occupied by agricultural lands (60.41%), primarily consisting of arable land (1,928 ha), natural pastures (727 ha), hay meadows (329 ha), and vineyards (7 ha). The non-agricultural area totals 1,960 ha, of which 1,631 ha (83.21%) consist of forests and other forested lands, 160 ha (8.16%) of buildings and courtyards, 50 ha (2.55%) of water surfaces, and 109 ha (5.56%) of transportation infrastructure (Figure 2).

The black walnut (*Juglans nigra* L.), belonging to the family Juglandaceae, is native to North America (Canada and the United States) and was introduced to Europe around 1760. It is considered one of the most valuable exotic forest species due to its high-quality timber and rapid juvenile growth. The species is widely cultivated in Hungary, France, and Germany (Nicolescu et al., 2020).

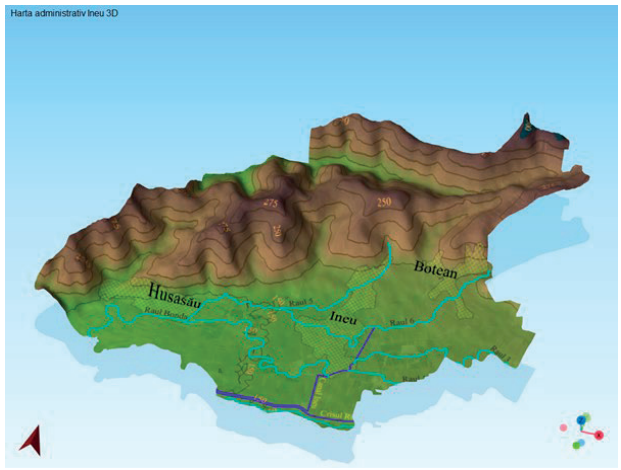


Figure 2. Topography of the administrative area of Ineu, 3D

Black walnut thrives in mild climates with regular rainfall and deep, fertile, well-drained soils. It is characterized by high resistance to storms and pests and by its strong ecological adaptability. Moreover, it is recognized as an allelopathic species, due to the presence of juglone, a biochemical compound that can inhibit the growth of surrounding vegetation.

In Europe, *Juglans nigra* is cultivated for high-value timber production, in agroforestry systems, land restoration projects, and ornamental plantings. In silvicultural practice, it is regenerated either by planting or direct seeding, in monocultures or mixed stands. Forest management operations typically include periodic tending and thinning, with a rotation period of approximately 70-80 years, aimed at producing veneer and high-quality furniture wood (Nicolescu, 2014).

The newly established community forest (Figures 3 and 4), situated adjacent to these forest compartments, enhances ecological connectivity and aligns with European policy guidelines on the development of green corridors.

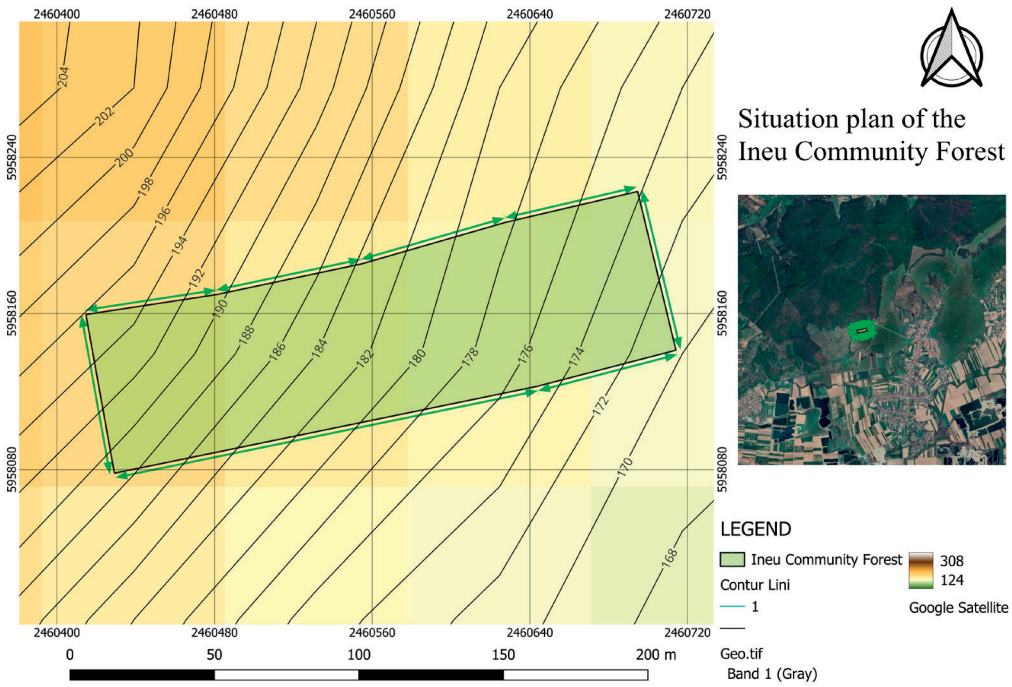


Figure 3. Geographical and altitudinal location of the Ineu Community Forest plot

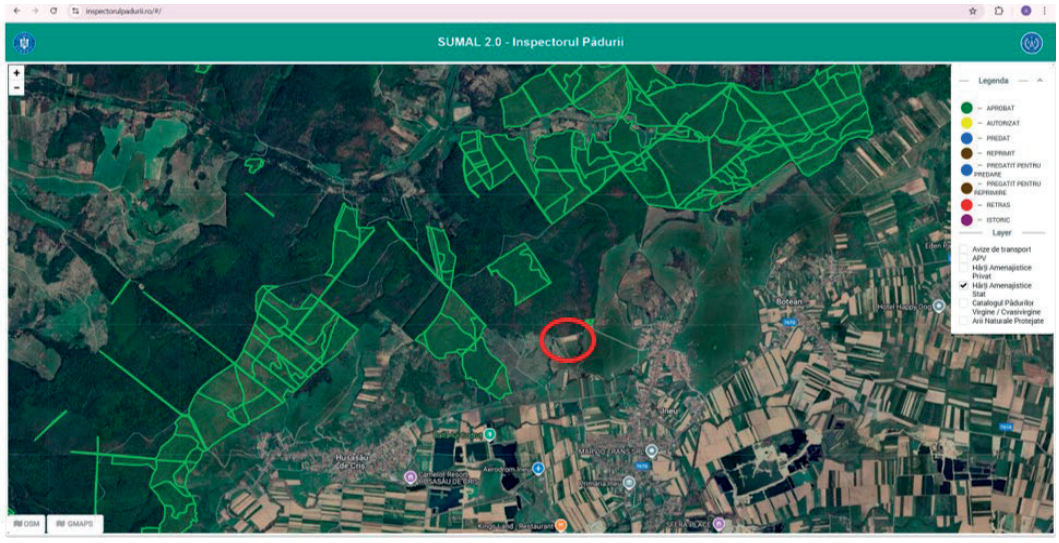


Figure 4. Location of the study area (red outline) within the forest fund (public and private ownership) - visualization from the SUMAL 2.0 "Forest Inspector" platform (screenshot)

Legal Framework and Evolution of Forestry Legislation

According to the current Forest Code (Law No. 331/2024, effective as of January 2025), a forest is defined as "land covered with trees that reach a height of more than 5 meters at maturity and that occupy an area of at least 0.5 hectares" (Law No. 331/2024). The Ineu project, covering 1 hectare and comprising forest species exceeding this height threshold, therefore qualifies as a forest and will be included in the national forest fund following its registration within the approved forest management plans. In comparison, the former Forest Code (Law No. 46/2008) contained less explicit provisions regarding the conversion of pastures into forests and did not provide procedural facilities for local administrative units. The new Code introduces several essential improvements:

- acceleration of the procedure for changing the land-use category of afforested areas;
- mandatory preparation of cadastral documentation and registration in forest management plans within 12 months;

• guaranteed access of local administrative units to forest protection and silvicultural services;
• additional restrictions on deforestation and land-use conversion, with only strictly regulated exceptions.

In the case of Ineu Commune, the land-use conversion was implemented through:
• the transfer of the land from the public to the private domain of the commune;
• Local Council Decisions No. 11 and No. 12 of April 3, 2025;
• registration in the integrated Cadastre and land book system (Law No. 7/1996; Order No. 700/2014).

This initiative is fully aligned with the Local Development Plan of Ineu Commune 2021-2027, which identifies as a strategic objective the increase of green areas with educational and recreational functions (Ineu Local Council, 2023).

MATERIALS AND METHODS

The research was conducted on a 0.6-hectare area (Zone A) within a young black walnut plantation, located at the base of a slope with southern exposure and moderate inclination. The soil type is cambic chernozem, with a loamy-sandy texture and good drainage. The regional climate is moderate continental, characterized by warm summers and extended dry periods, typical of the hilly lowland region.

Planting was carried out in spring year 2025, using one-year-old seedlings obtained from a certified nursery. The forest composition was designed so that all species are expected to reach heights exceeding 20 meters at maturity, thus meeting the legal criteria for forest classification according to Romanian forestry legislation.

The planting scheme applied was 2 × 2 meters, corresponding to a density of 2,500 seedlings per hectare. Considering the total study area of 0.6 ha, approximately 1,500 seedlings were planted.

Within this area, seven sample plots (A1-A7) of 5 × 5 meters (25 m²) each were established, randomly distributed to capture the natural variability of site conditions. For each sampled seedling, the following variables were recorded:
• total height (cm);
• annual height increment (cm);
• health condition, assessed using a six-point scale, where:
  1 = very good condition, no visible damage symptoms (Figure 5);
  2 = slight discoloration or bifurcation/trifurcation at the apex;
  3 = moderate damage, visible discoloration (Figure 6);
  4 = severe damage, partially dry apex;
  5 = advanced decline;
  6 = dead or completely desiccated seedling (Figure 7).



Figure 5. Seedling in very good condition



Figure 6. Seedling with moderate damage (grade 3) – visible discoloration



Figure 7. Severely damaged and desiccated seedling with basal sprouting

Data processing was performed by calculating mean, minimum, and maximum values, amplitude, and variability indicators (standard deviation - SD, coefficient of variation - CV%), according to conventional statistical procedures commonly applied in forestry studies.

RESULTS AND DISCUSSIONS

The mean values of seedling heights and annual growth increments for the seven sample plots are presented in Table 1. The overall mean height of seedlings in Zone A was 59.5 cm, while the average annual height increment was 3.5 cm. These values are characteristic of young black walnut plantations in their early developmental stage, established under challenging climatic conditions, particularly prolonged drought.

The standard deviation (SD) of seedling heights was 6.8 cm, with a coefficient of variation (CV) of 11.4%, indicating a high degree of uniformity in height across the sample plots. For annual height increments, SD = 0.9 cm and CV = 25.8%, suggesting moderate variability, likely influenced by differences in soil moisture and microrelief conditions.

Table 1. Biometric results obtained from the seven sample plots

Sample plot	Mean height (cm)	Mean annual growth (cm)	Minimum height (cm)	Maximum height (cm)	Height range (cm)	Minimum growth (cm)	Maximum growth (cm)	Growth range (cm)
A1	61.1	5.2	30	73	43	0	12	12
A2	59.1	3.6	46	77	31	0	6	6
A3	62.4	3.6	45	83	38	0	15	15
A4	61.3	3.2	45	81	36	0	8	8
A5	49.9	3.2	28	70	42	0	6	6
A6	53.3	2.8	21	74	53	1	5	4
A7	69.1	2.7	51	79	28	0	5	5
Overall mean	**59.5**	**3.5**	**21**	**83**	**62**	**0**	**15**	**15**

Minimum heights ranged between 21 and 51 cm, while maximum heights reached up to 83 cm, resulting in an overall amplitude of 62 cm. Annual growth increments varied from 0 to 1 cm (minimum) and 5 to 15 cm (maximum), confirming developmental differences among seedlings, though within the expected range for this growth stage.

Seedling Health Condition

The distribution of health condition codes (1-6) (Figure 8) indicates that the majority of seedlings (≈67%) were classified within classes 1-2, corresponding to very good or slightly affected condition.

Moderate damage (codes 3-4) was observed in approximately 10% of individuals, while severely damaged or dead seedlings (codes 5-6) accounted for 24% of the total population. Only 5% of seedlings (3 individuals) were completely desiccated, and 2 seedlings (≈3%) were missing from the plots.

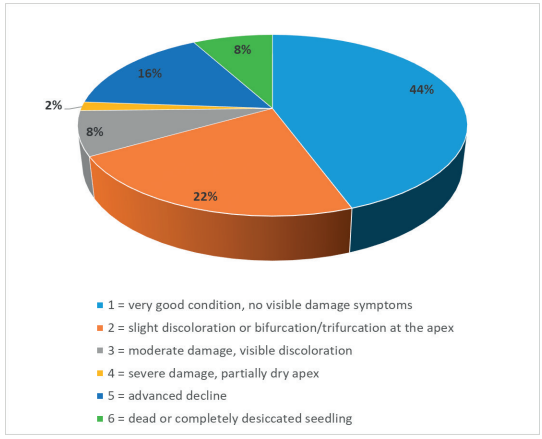


Figure 8. Distribution of planted seedlings by health condition (%)

The mean health score was 2.46, indicating a generally good to moderate overall condition, with most seedlings being healthy or only slightly affected, yet with a notable proportion of individuals classified in codes 5-6 (≈24%). The most frequently observed symptoms included leaf discoloration and terminal shoot

bifurcation, neither of which had a significant impact on vegetative growth.

CONCLUSIONS

The black walnut plantation in the study area (Zone A) exhibits a generally good state of development and remarkable uniformity, despite the restrictive climatic conditions experienced during the growing season. The mean height value (59.5 cm) and average annual height increment (3.5 cm) confirm the successful establishment of the plantation and its adequate adaptation to the local site conditions.

Analysis of variability indicators revealed low dispersion of height values (standard deviation 6.8 cm; coefficient of variation 11.4%) and moderate variability in growth (SD = 0.9 cm; CV = 25.8%), suggesting a balanced development pattern within the plantation. The phytosanitary condition was rated as good, with a mean health score of 2.46 on the 1-6 scale, and more than 66% of seedlings belonging to the upper health classes.

Based on these results, it can be concluded that black walnut performs favorably under the ecological conditions of the study site, confirming its potential for afforestation of lands with low ecological productivity. Annual monitoring of the same experimental plots (A1-A7) is recommended to assess growth dynamics, long-term stability, and possible physiological responses to climatic variability.

The findings demonstrate that local afforestation initiatives, even at small scales, can generate significant ecological and social benefits when well-planned and administratively supported. In the case of the analyzed area, the black walnut plantation showed a high survival rate and good health condition, indicating the species' suitability for ecological land reconversion in the hilly regions of Bihor County.

Beyond its technical aspects, the project illustrates the importance of cooperation between local public administration, academia, and the community. The involvement of volunteers, students, and pupils in planting activities played a key role in fostering environmental awareness and strengthening the relationship between citizens and their natural environment.

The conversion of a communal pasture into a community forest represents a best-practice example of implementing the European Green Deal principles at the local level, contributing to green area expansion and enhancing the climate resilience of rural communities. Such initiatives can serve as strategic tools for local governments, integrating environmental protection, sustainable development, and ecological education.

The establishment of a broadleaf community forest on land formerly used as pasture constitutes not only a change in land use, but also a reconfiguration of the landscape with ecological, economic, and socio-cultural dimensions. This transformation generates multiple ecosystem services, including carbon sequestration, water regime regulation, biodiversity enhancement, and improved environmental quality for the local community.

The innovative nature of such an intervention requires the integration of advanced forestry knowledge and established typological models, enabling the evaluation of key species traits such as crown architecture, photosynthetic rate, growth dynamics, disease resistance, tolerance to extreme climatic factors, root system development, leaf phenology, and fruiting capacity. Within this framework, the role of forestry specialists is essential to ensure the ecological resilience and long-term functionality of the forest ecosystem, while strengthening the social dimension of sustainability.

REFERENCES

Nicolescu, N. V., Redei, K., Vor, T., Bastien, J. C., Brus, R., et al. (2020). A review of black walnut (*Juglans nigra* L.) ecology and management in Europe. *Trees, 24*, 1087–1112.

Nicolescu, N. V. (2014). Considerations regarding black walnut (*Juglans nigra*) culture in north-west Romania. *Forestry, 71*(4), 349–358. https://doi.org/10.1093/forestry/71.4.349

Pop, S.-B., Sălăgean, T., Pop, N., & Rusu, T. (2023). Study on the use of agricultural land in the North-West Development Region of Romania based on the sociological survey. *AgroLife Scientific Journal, 12*(2), 167–179.

***Agenția Națională pentru Arii Naturale Protejate (2023). Ghid pentru înființarea pădurilor urbane și comunitare. Ministerul Mediului, Apelor și Pădurilor.

***Agenția Națională pentru Arii Naturale Protejate (2023). Raport anual privind implementarea

strategiilor de conservare și extinderea suprafețelor împădurite. București: ANANP.
***European Commission (2021). EU Forest Strategy for 2030. Brussels: European Commission. Retrieved from https://ec.europa.eu/environment/forest/strategy
***European Parliament (2022). The European Green Deal: Towards a climate-neutral Europe. Brussels: European Union.
***European Union (2021). Regulation (EU) 2021/2115 establishing rules on support for strategic plans under the Common Agricultural Policy (CAP 2023–2027). Official Journal of the European Union.
***European Union (2024). Nature Restoration Law (Regulation (EU) 2024/1405 of the European Parliament and of the Council). Official Journal of the European Union.
***Food and Agriculture Organization of the United Nations (FAO) (2022). Forests for a sustainable future: Forest restoration and landscape resilience. Rome: FAO.
***Government of Romania (1991). Legea fondului funciar nr. 18/1991, republicată. Monitorul Oficial al României.
***Government of Romania (1996). Legea cadastrului și a publicității imobiliare nr. 7/1996, cu modificările și completările ulterioare. Monitorul Oficial al României.
***Government of Romania (2011). Legea nr. 214/2011 privind organizarea, administrarea și exploatarea pajiștilor permanente. Monitorul Oficial al României, nr. 163/2011.
***Government of Romania (2013). Ordonanța de Urgență nr. 34/2013 privind organizarea și administrarea pajiștilor permanente. Monitorul Oficial al României, nr. 267/2013.
***Government of Romania (2019). Ordonanța de Urgență nr. 57/2019 privind Codul administrativ. Monitorul Oficial al României.
***Government of Romania (2024). Legea nr. 331/2024 privind Codul Silvic. Monitorul Oficial al României, nr. 1256/2024.
***Institutul Național de Statistică (2024). Anuarul Statistic al României 2024. București: INS.
***Legea nr. 46/2008 privind Codul Silvic, cu modificările și completările ulterioare. Monitorul Oficial al României.
***Ministry of Agriculture and Rural Development (MADR) (2024). Norme metodologice privind schimbarea categoriei de folosință a pajiștilor permanente și împădurirea terenurilor degradate. București: MADR.
***Ordinul nr. 700/2014 pentru aprobarea Regulamentului de avizare, recepție și înscriere în evidențele de cadastru și carte funciară. Monitorul Oficial al României.
***Primăria Comunei Ineu (2023). Strategia de dezvoltare durabilă a Comunei Ineu 2021-2027. Ineu: Primăria Ineu.
***Primăria Comunei Ineu (2023). Planul de dezvoltare locală 2021–2027. Ineu: Consiliul Local.
***Primăria Comunei Ineu (2025a). Hotărârea Consiliului Local nr. 11 din 03.04.2025. Ineu: Primăria Ineu.
***Primăria Comunei Ineu (2025b). Hotărârea Consiliului Local nr. 12 din 03.04.2025. Ineu: Primăria Ineu.