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Mapping restoration interventions of degraded forests in Italy: a stakeholder survey

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Complete List of Authors:	Di Domenico, Giorgia; CREA, Research Centre for Forestry and Wood Baldessari, Sofia; Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA) Becagli, Claudia; CREA Research Centre Agricolture and Environment , De Meo, Isabella; Consiglio per la Ricerca in Agricoltura e l'analisi dell'economia agraria (CREA), Centro di ricerca Agricoltura e Ambiente, Firenze. Giordano, Daniele; Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA) Paletto, Alessandro; Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA), Research Centre for Forestry and Wood
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SCHOLARONE MANUSCRIPTS

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Abstract - The EU Nature Restoration Regulation (2024/1991) introduces a new framework for planning and monitoring restoration measures in degraded ecosystems, including forests. This study provides an overview of forest restoration practices in Italy through a stakeholder survey conducted between November 2025 and April 2026. The questionnaire included 31 questions on project status, site and habitat characteristics, degradation drivers, restoration objectives and measures, monitoring, funding and costs. Overall, 56 interventions were identified and analysed. Projects were recorded in almost all Italian regions, with stronger representation in northern and central Italy. Restoration interventions were mainly promoted by protected-area managers, regional bodies, forest consortia and municipalities. Public ownership predominated (64.3%), while private forest land was under-represented (12.5%). Multiple degradation drivers were the most frequent cause of degradation (34.5%), followed by the abandonment of active management, wildfires, windstorm damage and invasive alien species. Vegetation management, sustainable silviculture, improvements to ecological functionality and habitat restoration were the main intervention categories. Respondents expected mostly moderate to high positive effects on the seven forest indicators listed in the Regulation, particularly for native tree dominance and tree-species diversity. The results indicate an active but fragmented restoration framework and highlight the need for stronger engagement of private owners, monitoring standardisation, long-term funding and multi-level governance.

Keywords: Regulation (EU) 2024/1991, forest degradation, forest indicators, forest monitoring, National Restoration Plan.

Introduction

The European Union (EU) Nature Restoration Regulation (NRR) was adopted in June 2024 (European Commission 2024) with the aim of reversing the decline in biodiversity and restoring degraded terrestrial and marine ecosystems across Europe in accordance with the EU Biodiversity Strategy for 2030 (European Commission 2020). The NRR

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marks a substantial shift in EU environmental policy by introducing legally binding restoration targets for degraded ecosystems (Aragão and van de Braak 2026).

Effective implementation of the NRR depends on its translation into national policies and actions. To this end, Member States are required to prepare National Restoration Plans by September 2026, identifying priority areas, restoration measures, monitoring systems, and assessment procedures (Mauerhofer et al. 2026). Following this timeline, Italy has submitted its proposed National Restoration Plan to the European Commission. Coordinated jointly by Ministry of Environment and Energy Security (MASE) and Ministry of Agriculture, Food Sovereignty and Forests (MASAF), the draft was developed with technical and scientific support from Italian National Institute for Environmental Protection and Research (ISPRA) and Council for Agricultural Research and Economics (CREA), alongside the active involvement of national implementing bodies.

Among the ecosystems considered by the NRR, forests are central because they contribute to biodiversity conservation but at the same time also to the provision of several ecosystem services such as carbon storage, soil protection, water regulation and the well-being of local communities (Ballesteros et al. 2026). In this context, the NRR provides an opportunity to support the transition towards healthier and more resilient forest ecosystems, while fostering sustainable and forward-looking forest governance and management across EU Member States (Svensson et al. 2026).

Achieving the objectives of the NRR requires identifying and addressing the ecological processes that undermine forest condition and resilience, making the concept of forest degradation central to the implementation of restoration policies. Forest degradation is a complex and context-dependent concept that involves the decline of biodiversity, the reduction of biomass and canopy cover, the loss of soil functionality and a reduced capacity to provide ecosystem services (Lund 2009, Maes et al. 2023). In Mediterranean and temperate European forests, degradation is frequently driven by a combination of disturbances and pressures, including wildfires, abandonment of active management, windstorms, invasive alien species, pests and pathogens, intensive harvesting, land-use change, and climate-related stress (Peñuelas and Sardans 2021, Seidl et al. 2017). Acting individually or synergistically, these drivers can result in long-term declines in ecological functionality and ecosystem resilience (Thom and Seidl 2016).

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Forest restoration can follow active or passive approaches. An active restoration approach includes planting, assisted regeneration, thinning, removal of invasive species, riparian stabilisation, soil improvement and habitat management (Schubert et al. 2025). A passive restoration approach relies on natural regeneration after the reduction or removal of degradation pressures (Ciccarese et al. 2012, Gann et al. 2019). In practice, forest restoration often combines ecological and silvicultural objectives, including structural diversification, native tree-species enhancement, connectivity improvement, deadwood and microhabitat retention, soil carbon recovery and risk reduction.

The NRR identifies seven indicators (NRR Art. 12) to assess restoration progress in forest ecosystems: standing deadwood, lying deadwood, the share of uneven-aged forests, forest connectivity, soil organic carbon stock, the share of forests dominated by native tree species and tree-species diversity. EU Member States must also improve the Common Forest Birds Index, a multi-species indicator used to measure the population abundance trends of common bird species. Together, these indicators provide a common policy framework for evaluating restoration outcomes; however, their effective implementation depends on a solid understanding of existing restoration practices, monitoring capacities, the availability of medium- and long-term monitoring data, and potential implementation barriers (Hildt 2025). Since many restoration outcomes become detectable only over extended timeframes, long-term monitoring is essential to assess the effectiveness of restoration interventions and their contribution to ecosystem recovery and NRR targets. Furthermore, achieving measurable progress toward these indicators requires restoration actions that are adapted to local ecological and socio-economic contexts.

Because forest restoration takes place within a multifunctional framework characterized by multiple land uses and stakeholder interests, social acceptance and stakeholder engagement are critical determinants of restoration success. In Europe, landscapes are widely recognised as cultural landscapes, shaped by interacting ecological, social, economic, and cultural processes (Linnell et al. 2015). Therefore, forest restoration is more likely to succeed when interventions are designed and implemented in collaboration with local stakeholders, and when communication, participation, and the balancing of interests are integrated from the outset (Marquard et al. 2025, Stanturf 2021). Reflecting this perspective, the NRR explicitly recognises the importance of participatory

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approaches by requiring EU Member States to ensure that the National Restoration Plans are prepared through open, transparent, inclusive, and effective processes (NRR Art. 14). Italy provides a particularly relevant case study because of its high ecological diversity, long tradition of forest management, expanding forest area, and the wide range of restoration initiatives implemented under different environmental and governance settings (Gasparini et al. 2022, Nocentini et al. 2021). The Italian Forest sector has long been influenced by close-to-nature silviculture and ecosystem-based management approaches, these principles have been developed and progressively refined in Italy since the early twentieth century (Paci 2004, Nocentini et al. 2021, Nocentini 2024), which share several objectives with contemporary forest restoration, including the enhancement of structural diversity, ecological resilience, and biodiversity conservation, and which are increasingly recognised as a suitable basis for adapting European forests to climate change (Brang et al. 2014). However, information remains fragmented regarding the extent to which restoration interventions have been monitored and their long-term contribution to ecosystem recovery and the forest indicators established under the NRR. Although these silvicultural traditions have already produced tangible, decades-long outcomes in several Italian regions, their contribution has rarely been benchmarked against standardised ecological indicators, which limits the extent to which past experience can inform the evidence base required by the NRR. Despite the existence of several local restoration experiences, consolidated evidence on forest restoration projects implemented before the adoption of the NRR remains limited. Such evidence is needed to identify practices that may be transferable across different ecological and institutional contexts.

Starting from these considerations, this study aims to provide the first national overview of forest restoration initiatives implemented in Italy before the adoption of the NRR. Specifically, the study examines: (i) where restoration interventions have been implemented; (ii) who promotes, owns, and finances them; (iii) which degradation drivers and restoration objectives they address; (iv) the restoration measures adopted; and (v) their expected contribution to the forest indicators established under the NRR, as estimated by respondents considering the type of intervention implemented or in progress. In addition, the study analyses monitoring approaches, implementation costs, and funding mechanisms associated with these restoration initiatives.

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Materials and methods

The study was designed as an exploratory national survey. Given the relatively small and non-random sample size (n=56, reduced to n=55 for the multivariate analyses), the results presented below are descriptive and hypothesis-generating rather than confirmatory. The study was structured in four steps which can be summarised as follows: (i) stakeholder mapping; (ii) questionnaire design and pre-testing; (iii) online survey administration, and (iv) data analysis and interpretation (Fig. 1).

[Here Fig. 1]

In the first step (i), a stakeholder mapping exercise was carried out between June and August 2025 to identify all relevant organizations and associations with a stake in the restoration of degraded forests. The mapping focused on actors operating at the national level, encompassing public bodies (national, regional and provincial managers), forest owners, planners, sectoral associations, third-sector organisations and other institutions directly or indirectly involved in forest restoration and sustainable forest management initiatives. Theoretically, stakeholder mapping is a process aimed at defining aspects of a social phenomenon affected by a decision, to identify groups who are affected by or can affect those parts of the phenomenon (Reed et al. 2009), and to prioritize groups for involvement in a decision-making process (Reed and Curzon 2015). In the present study, four criteria were adopted to identify stakeholders: interest and influence on the topic of forest restoration; geographical origin (region or autonomous province); and stakeholder category (distinguishing between public institution, private organization and third-sector association). Geographical coverage was considered with the aim of collecting information from as many Italian regions and autonomous provinces as possible. The preliminary stakeholder list was developed with the support of three national experts in restoration ecology, environmental policy and participatory forest management. The preliminary list comprised 352 stakeholders including forest owners and managers, planners, regional and provincial officers, protected-area managers, professional associations and third-sector organisations.

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Respondents were also invited to identify additional stakeholders that they considered relevant to the implementation of forest restoration activities. This iterative procedure followed a snowball sampling approach (Ting et al. 2025), allowing the stakeholder list to be progressively expanded and refined. Through this process, the initial list of 352 stakeholders was extended to 627 stakeholders, all of whom were subsequently invited to participate in the survey. Because the survey combined purposive stakeholder selection with snowball sampling, the resulting dataset should be regarded as an exploratory convenience sample rather than a statistically representative sample of all organisations or restoration initiatives operating in Italy.

The questionnaire (step ii) was developed between September and October 2025 in a semi-structured format composed of both closed-ended and open-ended questions.

A preliminary version of the questionnaire was subjected to a pre-test involving two expert stakeholders selected for their direct experience in the planning and implementation of forest restoration interventions.

Pre-testing represents an essential step in survey development, as it allows researchers to verify whether questions are understood by respondents as intended and whether the instrument effectively captures the information of interest (Hilton 2017). The exercise was undertaken to identify potential shortcomings in question design, assess the clarity and appropriateness of the wording, evaluate the logical flow of the questionnaire, and estimate the time required for its completion. Feedback collected during this phase informed the revision of the survey and contributed to enhancing its overall validity and comprehensibility. After the pre-test, three questions were modified, one question was added and one was removed because it was redundant.

The final questionnaire consisted of 31 questions (Supplementary Material 1) organised into six sections and included closed-ended, multiple-choice, Likert-scale, and open-ended questions.

The first section collected general information on the responsible organisation and the restoration project implemented or in the process of being implemented.

The second section focused on site characteristics, including geographical location, ownership (public, private, or mixed), and forest type. It also investigated the main degradation drivers and the intensity of degradation, classified as: (i) low, when the ecosystem retains most of its ecological functions and original biodiversity; (ii) medium,

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when significant alterations affect ecosystem structure, species composition, or ecological processes; (iii) high, when the ecosystem is severely degraded, with widespread loss of key species and major alterations to soils and natural processes.

The third section examined the project's main and secondary restoration objectives, the restoration measures implemented, the tree species used, the origin of planting material, and any post-intervention silvicultural treatments. It also explored potential effects on the Common Forest Birds Index and on the seven NRR indicators over a 10–20-year period using a five-point Likert scale.

The fourth section addressed project monitoring, including the existence of a monitoring plan, monitoring frequency, and the NRR indicators included in the monitoring activities.

The fifth section investigated the main funding sources supporting the restoration project.

Finally, the sixth section explored future perspectives, focusing on respondents' awareness of opportunities associated with NRR implementation in Italy and other restoration actions that should be considered for degraded forest ecosystems.

The online questionnaire (step iii) was administered through the EU Survey platform between November 2025 and April 2026. The invitation e-mail described the objectives of the study and the use of collected data. A reminder was sent in January 2026 to all those who had not yet filled out the questionnaire.

A total of 627 stakeholders were invited to participate in the survey. Of these, 56 completed the questionnaire, corresponding to an apparent response rate of 8.9%. This percentage should not be considered a true response rate, since receipt of the invitation could not be verified for all invites and some of the contacted stakeholders were not directly involved in restoration interventions. Therefore, the denominator likely overestimates the number of stakeholders effectively reached and eligible to participate.

At the end of the data-collection phase, all 56 forest restoration interventions were retained for the descriptive analysis. However, one intervention was excluded from the subsequent statistical analysis (step iv) because of incomplete information on key variables required for multivariate analyses (n=55).

The expected impacts of restoration interventions on the seven NRR forest indicators were assessed by respondents using a five-point Likert scale, from 1 = no impact to 5 = very high positive impact. Question Q3.7 collected respondents' estimates of the likely contribution of the restoration intervention, implemented or in progress, to the seven NRR

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indicators over a 10–20-year period. These estimates were based on the type of intervention and not on measured outcomes; scores were therefore analysed for all interventions together, irrespective of their status.

Descriptive statistics were calculated for all survey items: frequencies and percentages for categorical variables, and median and interquartile range (IQR) for Likert-scale items. Because of the small and unbalanced size of several subgroups, no inferential group comparisons were performed. Multiple correspondence analysis (MCA) was used as an exploratory, descriptive multivariate technique to visualise associations among categorical variables (degradation drivers, degradation intensity and main restoration objectives); it does not test statistical significance, and the resulting patterns should be regarded as indicative only.

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Results

Geographical distribution and project characteristics

The survey collected information on 56 restoration interventions in degraded forests implemented between 1987 and 2026. Projects were recorded in all Italian regions except Marche and Molise regions, with stronger representation in Lombardy (27.3%), Tuscany (14.6%) and Piedmont (10.9%). One restoration project involved multiple regions along the Po River riparian corridor (Fig. 2).

[Here Fig. 2]

Two-year projects were the most frequent (25.5%), followed by three-year projects (17.0%). Projects lasting ten years or more represented 12.8% of the sample. Overall, 55.4% of interventions were completed, 37.5% were ongoing and 7.1% were planned or close to implementation. Approximately 69% of the surveyed projects were initiated after 2020 (Fig. 3).

[Here Fig. 3]

Restoration project promoters were diversified, but mostly public or semi-public. Protected-area managers accounted for 25.0% of projects, followed by regions or regional

agencies (17.9%), forest consortia and unions of municipalities (16.1%) and municipalities (14.3%). Only 19.6% of projects were implemented by a single promoter, whereas 50.0% involved two actors and 30.4% involved more than three actors. These data indicate that multi-actor arrangements were common, even though private organisations and enterprises played a more limited role.

Most interventions were implemented on public land (64.3%), followed by mixed public-private ownership (23.2%), whereas only 12.5% were carried out on private forest land. This distribution contrasts with the structure of forest ownership in Italy, where private forests represent a large share of the national forest estate (Gasparini et al. 2022).

Forest context and degradation drivers

Interventions covered different forest contexts. Projects were carried out in lowland, hilly and mountain areas. Natural and semi-natural forests represented 55.8% of projects, forests derived from artificial afforestation 26.0%, urban forests 9.1% and other forest types, mainly riparian formations, 9.1%. The most represented forest categories were mountain and Mediterranean pine forests and Scots pine forests, followed by European beech forests and Norway spruce forests. In addition, 57.1% of projects were located within the Natura 2000 network.

Multiple degradation drivers were the most frequent cause of degradation (34.5%), followed by abandonment of active management (18.2%), wildfires (14.5%), windstorm damage (7.3%) and invasive alien species (7.3%) (Fig. 4).

[Here Fig. 4]

The Multiple Correspondence Analysis (MCA) ordination plot (Fig. 5) suggests an exploratory separation of degradation intensity classes along the first dimension (F1); as MCA is a descriptive technique, this pattern should be regarded as indicative rather than statistically confirmed. The first two eigenvalues are 0.762 and 0.677 respectively, and they explain 26.17% of the total variability in the dataset (F1 = 13.86% and F2 = 12.31%), providing a synthetic representation of the principal relationships among degradation intensity levels and causal factors. The total inertia is equal to 5.5.

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Low degradation intensity is positioned on the right-hand side of the plot and is mainly associated with management-related disturbances, including management abandonment, insect/pathogen attacks, intensive forest management, and ungulate damage.

In contrast, high degradation intensity is in the upper-left quadrant, where it is closely associated with land-use change and extractive activities. The proximity of these categories suggests that severe degradation may be primarily associated with intensive anthropogenic disturbances capable of causing substantial alterations to ecosystem structure and functioning.

Medium degradation intensity occupies the lower-left quadrant and is predominantly associated with invasive alien species establishment and wind-, flood-, or landslide-induced damage, while also showing some proximity to wildfire occurrences.

[Here Fig. 5]

Restoration objectives and intervention types

The most frequent main restoration objective was the restoration or increase of tree cover (33.9%), followed by the increase of plant and/or animal biodiversity (23.2%). Restoration or conservation of protected habitats and reduction of fire or flood risk accounted for 7.1% each. Secondary objectives were more diversified and often combined biodiversity enhancement, improvement of ecosystem functionality, risk reduction and support to climate-change mitigation or adaptation.

The MCA ordination plot exploring the relationship between degradation drivers and priority objectives (Fig. 6) suggests a structured distribution across quadrants, which may reflect targeted management responses, although these associations are descriptive and were not statistically tested. The first two eigenvalues are 0.829 and 0.813 respectively, they explain 20.53% of the total variability in the dataset (F1 = 10.36% and F2 = 10.17%). The total inertia is equal to 8. On the left side of the plot (F1<0), acute climate and biological disruptions – e.g., wind/flood/landslide damage, wildfire, invasive alien species establishment – cluster closely with structural restoration goals like restoration or increase of tree cover and restoration of protected habitats, reduction of wildfire/flood risk. Conversely, long-term anthropogenic or site-specific pressures on the right side (F1>0), including extractive activities, intensive forest management and ungulate

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damage, tend to be associated with soil quality and ecological connectivity improvement. Interestingly, increase in plant and/or animal biodiversity occupies a central-lower position, showing proximity to more diffuse management challenges like management abandonment and environmental stress.

[Here Fig. 6]

Vegetation management was the most frequent macro-category of intervention (32.2% of implemented measures), followed by sustainable silviculture and forest management (27.3%), improvement of ecological functionality (20.6%) and habitat restoration and protection (19.9%). Common measures included the introduction of native tree species, diversification of vegetation structure and composition, thinning, continuous-cover or close-to-nature management, and actions to increase deadwood volume, microhabitat trees and ecological connectivity. These intervention categories show that restoration practices in the sample were not limited to planting but included a wider set of silvicultural and ecological measures.

Expected contribution to NRR indicators, monitoring and funding

Respondents expected mostly moderate to high positive effects of restoration interventions on the seven NRR forest indicators as shown in Figure 7, with considerable variability among respondents.

Median (IQR) scores were 2.5 (1–4.25) for standing deadwood, 3 (2–5) for lying deadwood, 3 (2–4) for uneven-aged structure, 3 (2.75–4) for connectivity, 3 (2.75–4) for soil organic carbon stock, 4 (3–4.25) for native tree dominance and 4 (3–5) for tree-species diversity (n = 56).

Therefore, the highest expected contributions concerned native tree dominance and tree-species diversity, while standing deadwood showed the lowest median values.

[Here Fig. 7]

The Common Forest Birds Index was not a central component of most restoration projects. Less than one third of projects reported positive effects on bird communities,

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while in several cases the indicator had not been explicitly considered or had not shown significant responses. This suggests that biodiversity monitoring, particularly regarding bird communities, may need to be strengthened and better connected to NRR requirements.

A monitoring system was present in 31 projects (55.4%), absent in 22 projects (39.3%) and not reported in three cases. Among projects with monitoring plans, annual monitoring was most frequent (54.8%), followed by biennial monitoring (12.9%) and other frequencies (32.3%). The most frequently monitored NRR indicators were lying deadwood and native-species dominance, followed by deadwood and uneven-aged structure. Overall, the results highlight a gap between the expected contribution of restoration measures to the NRR indicators and the systematic monitoring of these indicators over time.

Funding information was available for 53 projects. The main sources were regional or provincial funds (29.3%) and EU funds (24.0%). Internal funds from the promoter accounted for 16.0%, and other sources, mainly private or foundation funding, also represented 16.0%. Most projects relied on a single funding source (71.7%). The highest implementation costs per hectare were reported for restoration after invasive alien species (21,310 € ha^{-1}) and after intensive forest management (20,333 € ha^{-1}). For other degradation drivers, costs were generally below 5,000 € ha^{-1}.

The main descriptive results of the national stakeholder survey on forest restoration interventions in Italy are shown in Table 1.

[Here the Tab. 1]

Discussion

The results provide a valuable pre-implementation snapshot of forest restoration practices in Italy, establishing a reference baseline prior to the full implementation of the National Restoration Plan. The marked increase in restoration initiatives observed after 2020 may indicate the influence of evolving European policy frameworks, which have progressively placed ecosystem restoration at the centre of biodiversity conservation and climate action agendas. Restoration is a key pillar of the EU Biodiversity Strategy for 2030, whose legally binding restoration targets were conceived to strengthen ecological

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resilience and contribute to both climate change mitigation and adaptation (Pastore et al. 2025). Viewed in this context, the growing number of projects identified in Italy may represent an early response to the increasing political and institutional commitment to ecological restoration at the European level.

The relatively small number of restoration interventions identified through this survey, compared with the high proportion of Italian forests reported in an unfavourable conservation status under Article 17 of the Habitats Directive, deserves further comment. In our view, this discrepancy more likely reflects under-reporting of restoration activity than an overestimate of forest degradation. First, the survey specifically captured organised, documented interventions with an identifiable promoter, whereas passive or informal recovery processes – such as natural regeneration following the end of a disturbance, common on abandoned or marginal private land – are not captured by this type of survey. Second, unfavourable conservation status under Article 17 is assessed at habitat and species level over broad spatial and temporal scales and is therefore not directly comparable to a count of discrete, promoter-led restoration projects. Third, a share of the snowball-expanded stakeholder list was not directly involved in restoration, which inflates the denominator relative to the population actually eligible to respond.

However, the project sample analysed in this study also reveals a fragmented restoration landscape, with strong territorial and institutional diversity. The high share of public ownership and public promoters indicates that public institutions remain the main drivers of forest restoration actions. This represents a strength because public institutions, protected-area managers, regions, municipalities and forest consortia can mobilise technical expertise and coordinate local partnerships. Furthermore, publicly owned forests in various European regions are often managed with a stronger focus on public goods, such as biodiversity conservation and recreation, which are central objectives of ecosystem restoration (Keesstra et al. 2024).

At the same time, the limited presence of private forest ownership is a major weakness. Since private forests represent a large share of Italian forest land, a restoration strategy that does not adequately involve private owners may remain spatially limited. This challenge is further exacerbated by the high degree of forest-property fragmentation characterising many Italian regions, which can hinder coordinated restoration actions and reduce economies of scale in management interventions (Mauro 2025).

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However, private owners cannot be considered a homogeneous or exclusively profit-oriented group, as their objectives, motivations and capacities vary substantially (Weiss et al. 2019). This diversity can represent a challenge for policy design and implementation at different levels, requiring place-based approaches embedded within coherent policy and spatial-planning frameworks (Weiss et al. 2019). The National Restoration Plan should therefore include instruments specifically designed for private owners, such as technical support, simplified procedures, forest-owner associations, management agreements and public-private partnerships. These mechanisms could help overcome economic and organisational barriers to restoration and promote a broader adoption of restoration activities across different ownership contexts (Keesstra et al. 2024).

The prevalence of multiple degradation drivers confirms that restoration planning must address disturbance interactions. Wildfires, windstorms, invasive alien species, pests/diseases and management abandonment may interact and generate more complex restoration needs than single-driver degradation. This has implications for prioritisation: restoration measures should be selected according to degradation driver, intensity, ecological context and expected contribution to measurable indicators. A one-size-fits-all approach would not be suitable for Italian forests. These findings also highlight the need for flexible assessment frameworks capable of accounting for multiple and interacting degradation drivers. Such approaches can improve the identification of restoration priorities and support the selection of targeted interventions. Furthermore, spatially explicit and web-GIS-based tools may enhance restoration planning, stakeholder engagement and access to information, thereby facilitating the implementation and monitoring of restoration actions (Alturk et al. 2026).

Monitoring represents one of the key gaps. Although more than half of the restoration projects included monitoring activities, a large share did not. Moreover, monitoring frequency and indicators varied among projects. This is critical for the NRR because restoration success will depend on the capacity to demonstrate measurable ecological improvement. The lack of monitoring observed in many projects is consistent with a broader challenge in restoration practice, where relevant indicators are often unavailable because data collection is resource-intensive, technically demanding or financially costly (Kramer et al. 2026).

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A further limitation is that the contribution to the NRR indicators (Q3.7) was collected as an expert estimate based on the type of intervention and cannot be interpreted as evidence of achieved outcomes. In addition, the sample is small and non-random, and several subgroups (e.g. regions with one or two projects) are too small for reliable inferential comparisons; the findings should therefore be read as exploratory.

As a result, restoration outcomes may remain difficult to quantify and compare across projects, limiting the capacity to evaluate effectiveness and demonstrate progress towards restoration targets.

The seven forest indicators can provide a common framework, but their use requires harmonised definitions, field protocols, baselines and data-management procedures. The Common Forest Birds Index deserves particular attention, as it was not a central component of most projects.

Funding and costs are another relevant issue. Most projects relied on a single funding source, while active restoration can require substantial investment and long-term maintenance. This may limit the involvement of private owners and small local administrations. Future programmes should therefore combine implementation funding with resources for maintenance and monitoring, and should promote financial diversification across EU, national, regional and private sources. Beyond diversifying grant-based funding, dedicated financial instruments could help absorb the higher costs reported for restoration after invasive alien species and intensive forest management (Tab. 1): these include public schemes refunding restoration expenses in the aftermath of extreme events, already implemented for the forest sector in some EU Member States, and a wider uptake of forest insurance, which remains limited in Italy despite growing interest among forest owners (Sacchelli et al. 2018, Brunette and Couture 2023).

Overall, the synthesis of strengths, weaknesses, opportunities and threats highlights an active but still fragmented forest restoration landscape across the 56 projects (Fig. 8).

[Here Fig. 8]

The main strengths are the presence of an active project pipeline, well-established multi-actor networks and a diversified restoration measures, together with the long-standing Italian expertise in close-to-nature silviculture and ecosystem-based forest management

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on which restoration practice can build, whereas the main weaknesses concern the limited involvement of private forest ownership, uneven and non-standardised monitoring practices, the still marginal role of the Common Forest Bird Index, and high implementation costs for the most degraded sites. Future NRR implementation may provide opportunities for stronger funding, including through the National Restoration Plan, technical training for planners and managers, and monitoring standardisation, including the possible activation of dedicated financial instruments to offset the high costs reported for some interventions, such as public compensation schemes for restoration expenses after extreme-event damage and a wider use of forest insurance to share and reduce the financial risk associated with recurrent disturbances (Sacchelli et al. 2018, Brunette and Couture 2023), but increasing degradation complexity, climate-driven extreme events and fragmented governance remain key threats, together with the risk that, in the absence of such financial mechanisms, restoration in the most exposed areas may be delayed or abandoned after damaging events.

Conclusions

Italy already has a relevant set of forest restoration experiences that can inform the implementation of the Nature Restoration Regulation. These projects are distributed across most regions, involve multiple actors and include diverse measures, from vegetation management and sustainable silviculture to ecological-functionality improvement and habitat restoration.

The transition from local projects to a coherent National Restoration Plan requires stronger coordination. Priority actions include engaging private forest owners, standardising monitoring protocols, integrating the Common Forest Birds Index, ensuring long-term funding, activating dedicated financial instruments such as extreme-event compensation schemes and forest insurance, and linking restoration measures to degradation drivers and measurable indicators, while systematically collecting measured post-intervention data so that expected and obtained contributions to the NRR indicators can be compared in the future, providing owners, managers and planners with realistic timeframes for restoration outcomes.

If these aspects are addressed, existing experiences can become the basis for a more coordinated and effective national forest restoration strategy.

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The implementation of the NRR will depend on the capacity to establish robust monitoring systems able to assess restoration outcomes consistently over time. Harmonised indicators and data collection protocols are essential not only for reporting progress towards European targets but also for supporting adaptive management and improving the effectiveness of restoration interventions.

The past Italian experience demonstrates that substantial restoration capacity already exists within public administrations, protected areas, research institutions and local actors. Unlocking the contribution of private forest owners and strengthening cooperation among stakeholders will be essential to expand restoration efforts and achieve the scale required by the NRR. In this context, the National Restoration Plan represents a unique opportunity to connect existing initiatives within a common framework, transforming a fragmented set of experiences into a coherent long-term strategy for forest restoration in Italy.

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Conflicts of interest

The authors declare no conflicts of interest.

References

Alturk B., Konukcu F., Akgoz R., Çağlar F. 2026 - *Land degradation neutrality model and decision support system based on land use/land cover and climate change in the TR21 Thrace Region/Türkiye*. Environment, Development and Sustainability.

Aragão A., van de Braak K. 2026 - *Interpretation of the EU Nature Restoration Law: from pieces of a puzzle to a complete picture*. Restoration Ecology 34: e70318.

Ballesteros M., Řehounková K., Decleer K., Martínez-Ruiz C., Alday J.G., Gentili A., Nunes A., Selgueiro P.A., Mahy G., Bouchoms S., Kirmer A., Tischew S., Carabassa V., Nikolic N., Marrs R., Prach K. 2026 - *Maximising biodiversity potential in Europe's*

mines and quarries: A key role for EU Nature Restoration Regulation targets. Ambio 55: 280-296.

Brang P., Spathelf P., Larsen J.B., Bauhus J., Bončina A., Chauvin C., Drössler L., García-Güemes C., Heiri C., Kerr G., Lexer M.J., Mason B., Mohren F., Mühlethaler U., Nocentini S., Svoboda M. 2014 - *Suitability of close-to-nature silviculture for adapting temperate European forests to climate change.* Forestry 87: 492-503.

Brunette M., Couture S. 2023 - *Forest Insurance for Natural Events: An Overview by Economists*. Forests. 14: 289.

Ciccarese L., Mattsson A., Pettenella D. 2012 - *Ecosystem services from forest restoration: thinking ahead*. New Forests 43: 543-560.

European Commission 2020 - *EU Biodiversity strategy for 2030 - Bringing nature back into our lives*. European Commission 380, Brussels.

European Commission 2024 - *EU Nature Restoration Law. European Commission*. [Online]. Available: https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-regulation_en. [Accessed 7 July 2026].

European Commission 2024 - *Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration and amending Regulation (EU) 2022/869*. Official Journal of the European Union.

Gann G.D., McDonald T., Walder B., Aronson J., Nelson C.R., Jonson J., Hallett J.G., Eisenberg C., Guariguata M.R., Liu J., Hua F., Echeverria C., Gonzales E., Shaw N., Decleer K., Dixon K. 2019 - *International principles and standards for the practice of ecological restoration*. Restoration Ecology 27: S1-S46.

Gasparini P., Di Cosmo L., Floris A., De Laurentis D. 2022 - *Inventario Nazionale delle Foreste e dei Serbatoi Forestali di Carbonio. Metodi e risultati della terza indagine*. Springer, Cham. 576 p.

Hildt L. 2025 - *Levers for successful implementation of the EU Nature Restoration Law: preparing for systemic biodiversity litigation*. Restoration Ecology 34: e70197.

Hilton C.E. 2017 - *The importance of pretesting questionnaires: a field research example of cognitive pretesting the Exercise Referral Quality of Life Scale (ER-QLS)*. International Journal of Social Research Methodology 20 (1): 21-34.

For Review Only

Keesstra S., Lebelt L., Castellani C., Breil M., Akujärvi A., Pellens N., ... & Zimmer D. 2024 - *Nature-based Solutions to address forest disturbances under climate change: the case of fire and pests*. European Topic Centre on Climate change adaptation.

Kramer L., Augustyniak-Tunowska R., De Rijk S., Härkönen L.H., Grochowska J., Kagalou I., Carvalho L. 2026 - *Demonstrating Successful Restoration*. Deliverable 4, FutureLakes. [Online]. Available: https://futurelakes.eu/knowledge-hub/deliverables. [Accessed 7 July 2026].

Linnell J.D.C, Kaczensky P., Wotschikowsky U., Lescureux N., Boitani L. 2015- *Framing the relationship between people and nature in the context of European conservation*. Conservation Biology 29: 978–985.

Lund H.G. 2009 - *What is a degraded forest?* Forest Information Services, Gainesville, VA, USA: 1-39.

Maes J., Bruzon A.G., Barredo J.I., Vallecillo S., Vogt P., Rivero I.M., Santos-Martin F. 2023 - *Accounting for forest condition in Europe based on an international statistical standard*. Nature Communications 14: 3723.

Marquard E., Hermsdorf M., Dahms H., Schleicher K., Strunz S., Baron M., Settele J. 2025 - *Underpinning the EU Nature Restoration Regulation: five success factors for effective measures in the Member States*. Restoration Ecology 33 (7): e70121.

Mauro M. 2025 - *Il problema della frammentazione delle proprietà forestali e gli strumenti di aggregazione e cooperazione tra proprietari e tra imprese*. L'Italia Forestale e Montana 80: 85-94.

Mauerhofer V., Aragão A., Ciscato E., Leucci F. 2026 - *Nature restoration legislation, implementation, and enforcement: status, challenges, and solutions for the Restocene*. Restoration Ecology 34: e70417.

Nocentini S., Ciancio O., Portoghesi L., Corona P. 2021 - *Historical roots and the evolving science of forest management under a systemic perspective.* Canadian Journal of Forest Research 51: 163-171.

Nocentini S. 2024 - *Nature and forest management*. L'Italia Forestale e Montana 79 (3): 99-133.

Paci M. 2004 - *Current problems of close-to-nature silviculture in Italy*. Forest@ 1 (1): 3-9.

For Review Only

Pastore M.C., Lapenna A., Lazzarini L. 2025 - *Aligning Urban Greening Policies with the EU Nature Restoration Regulation: Gaps and Prospects in Italy*. In: "Nature-Positive Cities: Adaptive Spatial Planning in Italy for an Ecological Urban Transition". Springer Nature Switzerland, Cham: 1-11.

Peñuelas J., Sardans J. 2021- *Global Change and Forest Disturbances in the Mediterranean Basin: Breakthroughs, Knowledge Gaps, and Recommendations* Forests 12 (5): 603.

Reed M.S., Curzon R. 2015 - *Stakeholder mapping for the governance of biosecurity: a literature review*. Journal of Integrative Environmental Sciences 12(1): 15-38.

Reed M.S., Graves A., Dandy N., Posthumus H., Hubacek K., Morris J., Prell C., Quinn C.H., Stringer L.C. 2009 - *Who's in and why? Stakeholder analysis as a prerequisite for sustainable natural resource management*. Journal of Environmental Management 90: 1933–1949.

Sacchelli S., Cipollaro M., Fabbrizzi S. 2018 - *A GIS-based model for multiscale forest insurance analysis: The Italian case study*. Forest Policy and Economics 92: 106-118.

Schubert S.C., Zahawi R.A., Oviedo-Brenes F., Rosales J.A., Holl K.D. 2025 - *Active restoration increases tree species richness and recruitment of large-seeded taxa after 16–18 years*. Ecological Applications 35: e3053.

Seidl R., Thom D., Kautz M., Martin-Benito D., Peltoniemi M., Vacchiano G., Wild J., Ascoli D., Petr M., Honkaniemi J., Lexer M.J., Trotsiuk V., Mairota P., Svoboda M., Stanturf J.A. 2021 - *Forest landscape restoration: building on the past for future success*. Restoration Ecology 29: e13349.

Svensson J., Jonsson B.G., Ebenhard T. 2026 - *The EU Nature Restoration Regulation offers new opportunities for resilient forests and sustainable forestry*. Ambio 55 (7): 1520-1530.

Thom D., Seidl R. 2016 - *Natural disturbance impacts on ecosystem services and biodiversity in temperate and boreal forests.* Biological Reviews 91: 760-781.

Ting H., Memon M.A., Thurasamy R., Cheah J.H. 2025 - *Snowball Sampling: A Review and Guidelines for Survey Research*. Asian Journal of Business Research 15(1): 1-15.

Weiss G., Lawrence A., Hujala T., Lidestav G., Nichiforel L., Nybakk E., Quiroga S., Sarvašová Z., Suarez C., Živojinović I. 2019 - *Forest ownership changes in Europe: State of knowledge and conceptual foundations*. Forest Policy and Economics 99: 9-20.

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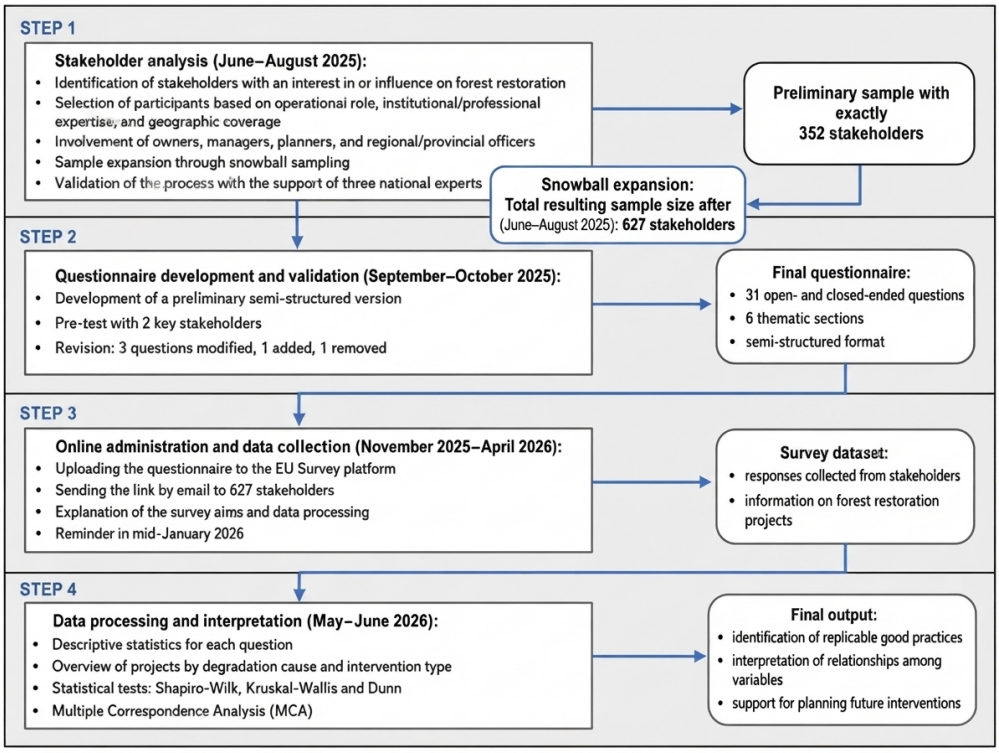

Methodological workflow adopted for the stakeholder survey on forest restoration interventions in Italy.

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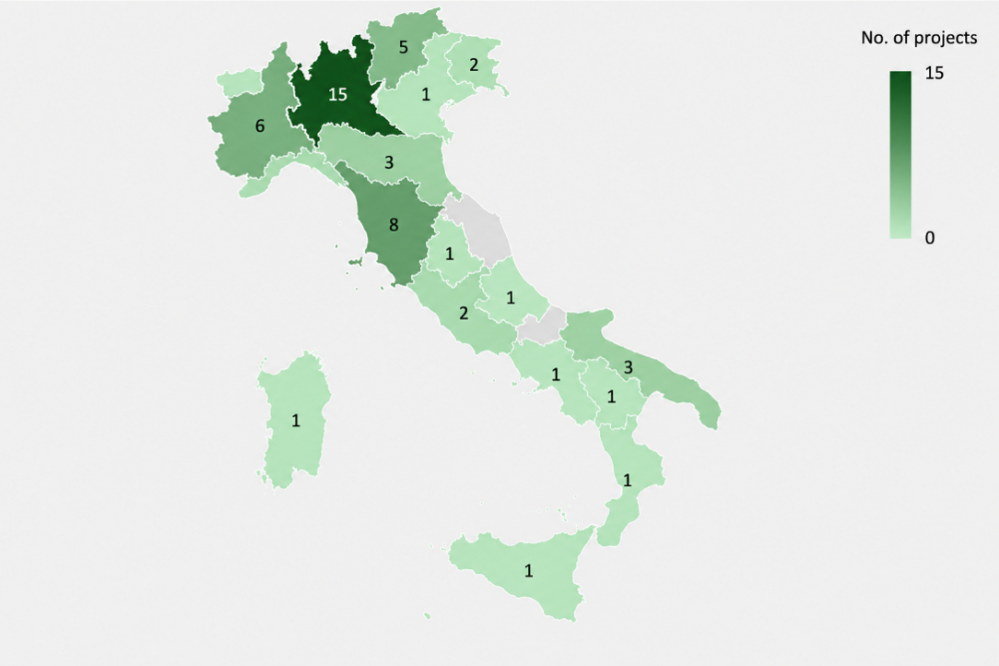

Geographical distribution of the sampled forest restoration projects by Italian region or autonomous province (n = 56)

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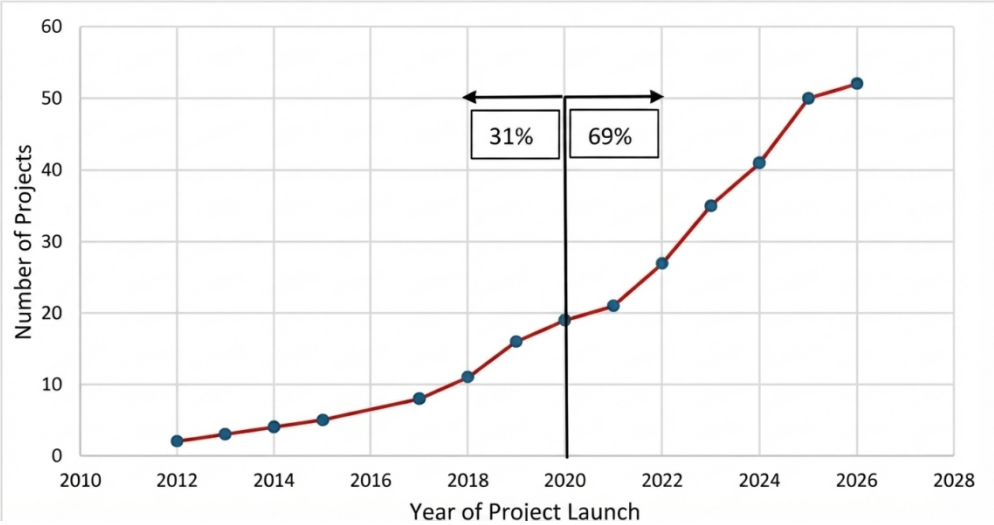

Cumulative trend of forest restoration projects by starting year.

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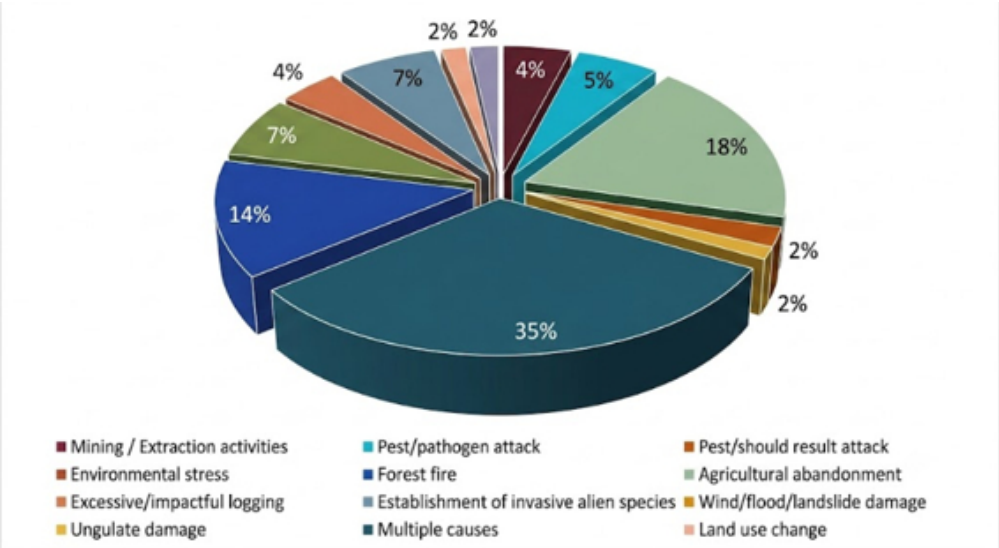
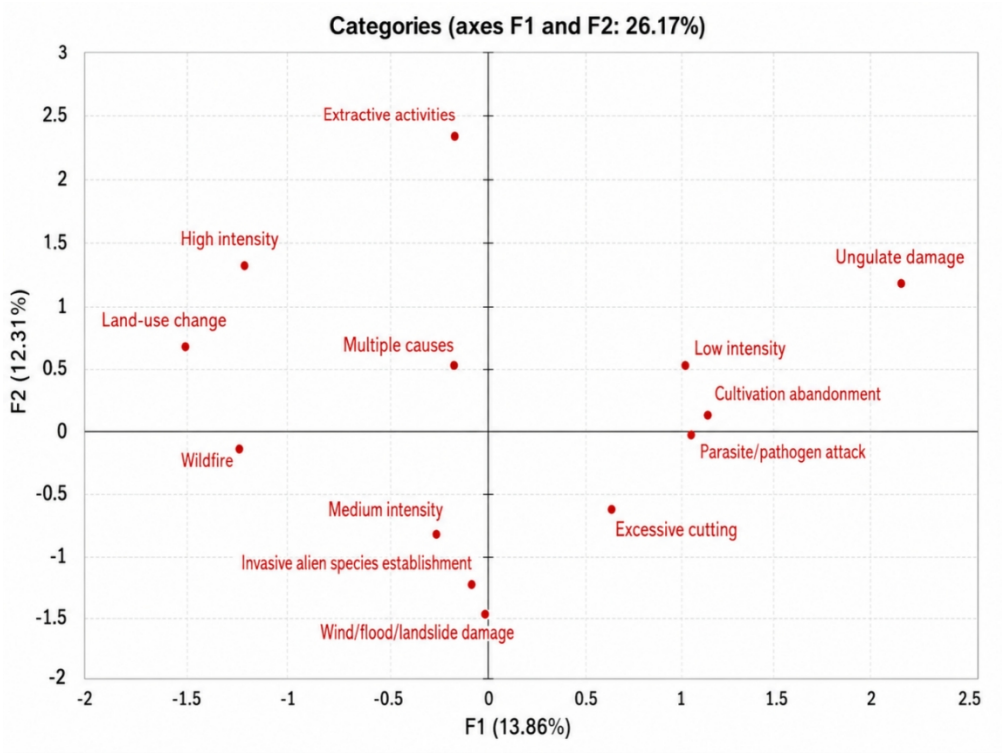


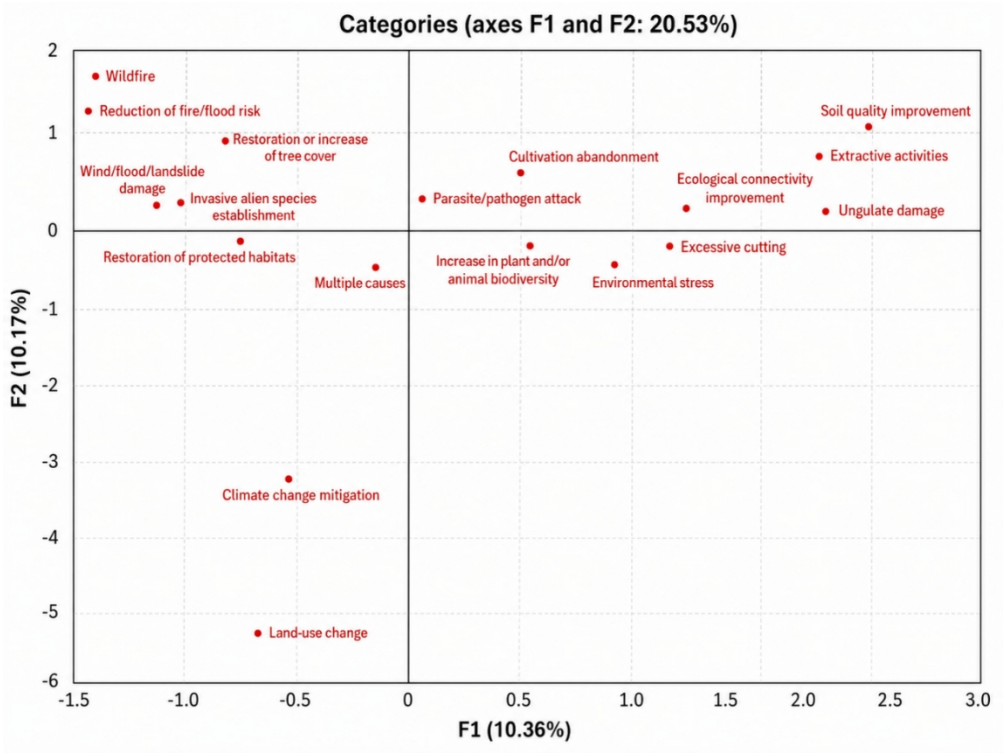
Distribution of the main degradation drivers affecting forest restoration sites included in the survey (n = 56).

122x66mm (118 x 118 DPI)



Multiple correspondence analysis between forest degradation drivers and degradation intensity (n = 55).

379x284mm (87 x 87 DPI)



Multiple correspondence analysis between forest degradation drivers and the main restoration objective (n = 55).

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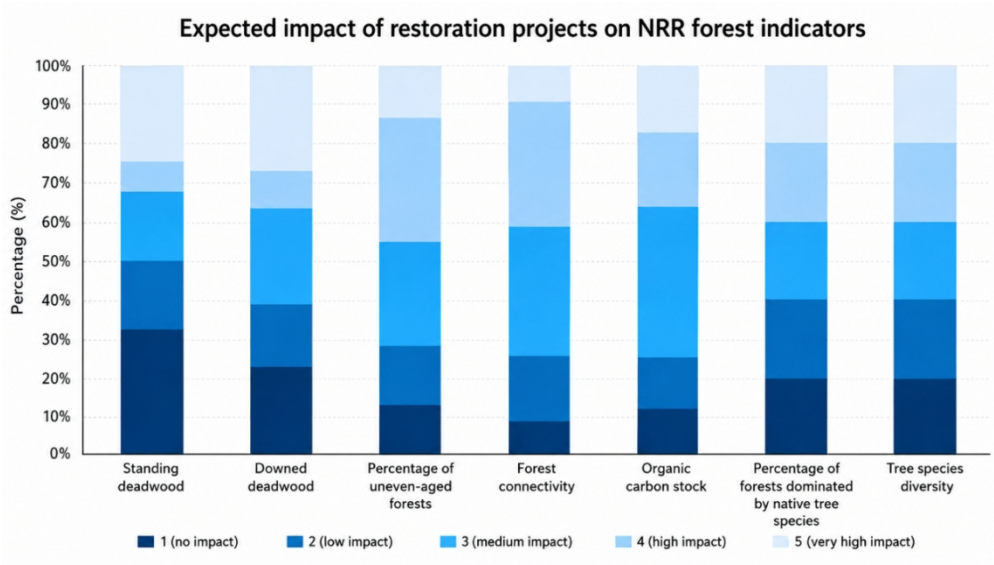
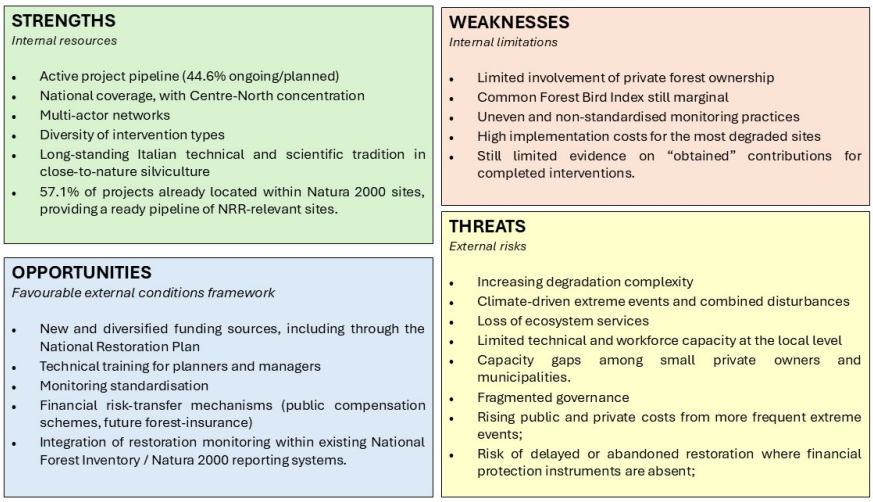


Expected impacts of restoration projects on the seven forest indicators included in the Nature Restoration Regulation, assessed using a five-point Likert scale.

370x208mm (87 x 87 DPI)



SWOT matrix summarising the pre-NRR forest restoration projects surveyed in Italy.

338x190mm (96 x 96 DPI)

Tables

Tab. 1 - Main descriptive results of the national stakeholder survey on forest restoration interventions in Italy.

Theme	Main results
Survey sample	56 forest restoration interventions; data collected from November 2025 to April 2026.
Project status	55.4% completed; 37.5% ongoing; 7.1% planned.
Promoters	Protected-area managers (25.0%), regions/regional agencies (17.9%), forest consortia/unions of municipalities (16.1%), municipalities (14.3%).
Ownership	64.3% public land; 23.2% mixed public-private; 12.5% private land.
Degradation drivers	Multiple drivers (34.5%), abandonment of active management (18.2%), forest fires (14.5%), windstorm damage and invasive alien species (7.3% each).
Main objectives	Tree-cover restoration/increase (33.9%); biodiversity increase (23.2%); protected-habitat restoration and risk reduction (7.1% each).
Measures	Vegetation management (32.2%); sustainable silviculture and forest management (27.3%); ecological-functionality improvement (20.6%); habitat restoration/protection (19.9%).
Monitoring	55.4% with monitoring plan; 39.3% without monitoring; annual monitoring most frequent among monitored projects (54.8%).
Funding	Regional/provincial funds (29.3%), EU funds (24.0%), internal funds (16.0%), other sources mainly private/foundation funding (16.0%).

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Supplementary materials 1

QUESTIONNAIRE
PRACTICES FOR THE RESTORATION OF DEGRADED FOREST ECOSYSTEMS

Dear participant,

This questionnaire was developed within the framework of the CAP Rural Network Project 2025-2027 in order to collect information on practices implemented in Italy for the restoration of degraded forest ecosystems. The objective is to map experiences carried out at local and national level in order to support the implementation of the Nature Restoration Law (Regulation (EU) 2024/1991) and promote effective and sustainable strategies for the conservation and recovery of degraded forest ecosystems in Italy.
In this survey, restoration intervention means the process aimed at helping, both actively and passively, the recovery of a degraded ecosystem in order to improve its structure and functions and strengthen its biodiversity and resilience.
The information you provide will help create a database useful for institutions, researchers and professionals involved in the management of degraded forest ecosystems.
We thank you in advance for the time and attention devoted to completing this questionnaire.
The answers provided are not collected to be associated with identified data subjects. Personal data may be known and processed in compliance with current legislation. Responses will be processed in anonymous and aggregated form and the survey results may be disseminated only in anonymous form. The data collected for this processing are stored for the time strictly necessary to pursue the purposes for which they were collected. Aggregated or anonymous data are not subject to data protection legislation.

1. GENERAL INFORMATION

Q1.1. Name and brief description of the restoration project/intervention: _____

Q1.2. Body/organisation responsible for the intervention: _____

Q1.3. Other bodies/organisations involved in implementing the intervention: _____

Q1.4. Implementation status of the intervention (single answer):

- Completed
- Ongoing
- Planned

Q1.5. Start year of the intervention: _____

Q1.6. Year (or expected year) of completion of the restoration intervention: _____

2. DESCRIPTION OF THE SITE AFFECTED BY THE INTERVENTION

Q2.1. Municipality and locality of the site: _____

Q2.2. Ownership type (single answer)

- Public
- Private
- Mixed

Q2.3. Elevation class where the site is located (multiple selection possible):
(ISTAT - National Institute of Statistics classification)

- 0-299 m
- 300-599 m
- 600-899 m
- 900-1199 m
- 1200-1499 m
- 1500-1999 m
- 2000-2499 m
- >2500 m

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Q2.4. Total area affected by the restoration intervention (in hectares) _____

Q2.5. Area with tree cover in the pre-intervention state (hectares or % of the total area): _____

Q2.6. Type of forest affected by the restoration intervention (multiple selection possible):

- Natural forest [1]
- Semi-natural forest [2]
- Forest originating from artificial reforestation
- Urban/peri-urban forest
- Other: _____

Q2.7. Forest category present in the restoration area (multiple selection possible):
(categories proposed by the NFI - National Forest Inventory)

- Larch and Swiss stone pine forests
- Norway spruce forests
- Silver fir forests
- Scots pine and mountain pine forests
- Black pine, Corsican pine and Bosnian pine forests
- Mediterranean pine forests
- Other pure or mixed conifer forests
- Beech forests
- Sessile oak, downy oak and pedunculate oak forests
- Turkey oak, Hungarian oak, Macedonian oak and Valonia oak forests
- Chestnut forests
- Hop-hornbeam and hornbeam forests
- Hygrophilous forests
- Other deciduous forests
- Holm oak forests
- Cork oak forests
- Other evergreen broadleaf forests
- Artificial poplar plantations
- Plantations of other broadleaf species
- Conifer plantations
- Subalpine shrublands
- Temperate-climate shrublands
- Maquis and Mediterranean shrublands

Q2.8. Did the restoration intervention concern part of a Natura 2000 Network site?

- YES
- NO

Q2.9. Main cause of degradation of the site affected by the restoration intervention (multiple selection possible):

- Forest fire
- Wind/flood/landslide damage
- Pest/pathogen attack
- Establishment of invasive alien species
- Deforestation/excessive cutting
- Land-use change (urbanisation, intensive agriculture)
- Overgrazing
- Abandonment of cultivation/management
- Extractive activities
- Environmental stresses (heatwaves, drought)
- Other: _____

Q2.10. Level of habitat impairment before the restoration intervention (single answer):

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- Low: the ecosystem retains most of its ecological functions and original biodiversity. Impacts are limited and reversible with minimal management or restoration interventions.
- Medium: significant alterations are present in structure, species composition or ecological processes. Some functions are impaired, but restoration is possible through targeted, medium-intensity interventions.
- High: highly degraded ecosystem, with widespread loss of key species and profound alteration of soils and natural processes. Restoration is possible only through complex, long-term interventions.

3. CHARACTERISTICS OF THE INTERVENTION

Q3.1. Main objective of the intervention (single answer):

- Restoration or increase of tree cover
- Increase in plant or animal biodiversity
- Restoration of protected habitats
- Improvement of ecological connectivity
- Improvement of soil quality
- Improvement of water quality
- Climate change mitigation
- Reduction of fire/flood risk
- Other: _____

Q3.2. Planned restoration measures (multiple selection possible):

Silviculture and sustainable forest management

- Silviculture aimed at a forest structure diversified by species and age, favouring natural regeneration and succession
- Close-to-nature or continuous-cover silviculture
- Development of mature stands through active management to promote self-regulation and resilience
- Integrated forest management to ensure social, environmental and economic benefits
- Spontaneous ecosystem evolution, allowing old-growth forests to form as well, by foregoing land use and favouring natural vegetation

Improvement of ecological functionality

- Increase in characteristic forest ecological elements: large, old and dying trees (habitat trees), downed and standing deadwood
- Improvement of connectivity between habitats to support population development, genetic exchange and adaptation to climate change
- Diversification of vegetation composition and structure

Vegetation management

- Control and/or reduction of invasive alien species, avoiding or minimising the introduction of new species
- Introduction of native tree species
- Diversification of vegetation composition and structure
- Support for the migration of provenances and species in response to climate change
- Control of shrublands and/or encroaching newly formed tree vegetation
- Reopening of clearings (removal of shrub vegetation) to maintain niches

Habitat restoration and protection

- Stabilisation of riparian forests, buffer strips, meadows and pastures
- Renaturalisation of watercourses
- Restoration of mosaics of non-forest habitats (grasslands, heathlands, ponds, rocky areas)
- Restoration of areas important for reproduction and seedling growth

Q3.3. Plant species used or targeted by the intervention:

- _____
- _____
- _____

Q3.4. Method of sourcing plant material (multiple selection possible):

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- Collection from local spontaneous populations
- Nursery production from local seed
- Purchase from a specialised nursery
- Transplanting of specimens from authorised recovery areas
- Other: _____

Q3.5. Indicate any silvicultural care carried out after the intervention: _____

Q3.6. Did the restoration intervention implemented at the site have a direct effect on birdlife?

- YES
- NO

Q3.6bis. If YES, specifically on which forest bird species present at the site:
(WBI - Woodland Bird Index, MITO2000 - Italian Ornithological Monitoring)

- I do not know
- Indicate the bird species: _____

Q3.7. In your opinion, what has been/will be the impact of the restoration interventions carried out or planned at the site on the seven indicators required by the Nature Restoration Law, considering a post-intervention period of 10-20 years? (Rating scale from 1 = no impact to 5 = very positive impact)

Standing deadwood

1	2	3	4	5

Downed deadwood

1	2	3	4	5

Percentage of forests with an uneven-aged structure

1	2	3	4	5

Forest connectivity (degree of compactness of forest-covered areas)

1	2	3	4	5

Organic carbon stock (in litter and mineral soil at a depth of 0 to 30 cm)

1	2	3	4	5

Percentage of forests dominated by native tree species

1	2	3	4	5

Tree species diversity (average number of tree species present on forest areas)

1	2	3	4	5

4. Monitoring of the intervention

Q4.1. Is a monitoring plan foreseen?

- YES
- NO

Q4.1bis. If YES, which of the following parameters are monitored (multiple selection possible):

- Deadwood
- Percentage of forests with an uneven-aged structure
- Forest connectivity
- Common bird index in forest habitat - Common Forest Bird Index
- Organic carbon stock
- Percentage of forests dominated by native tree species
- Tree species diversity
- Other (specify): _____

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Q4.2. Monitoring frequency:

- Annual
- Biennial
- Other (specify): _____

5. FUNDING OF THE INTERVENTION

Q5.1. Main sources of funding for the intervention (multiple selection possible)

- National Recovery and Resilience Plan (PNRR)
- European projects (e.g., LIFE)
- National funds
- Regional/provincial funds
- Internal funds of the body/organisation
- Other funds

Q5.2. Costs incurred for the restoration intervention (indicative figures):

Cost items	**€**
Costs for implementing the intervention	
Annual (average) costs for silvicultural care carried out after the intervention	
Costs for monitoring the intervention	
Other costs	

6. FUTURE DEVELOPMENTS

Q6.1. Are you aware of future opportunities related to the implementation of the Nature Restoration Law in Italy?

- YES, I am informed and have already assessed its implications
- YES, I am aware of it but have not examined it in depth
- NO, I am not aware of it

Q6.2. Are you aware of other restoration interventions for degraded forest ecosystems that, in your opinion, should be considered?

_____

7. DOCUMENTATION AND DATA AVAILABILITY

Links to reports, publications, articles, website

_____

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