



FORWARD PROJECTIONS

ITALY



SUPERB
Upscaling Forest Restoration



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EXECUTIVE SUMMARY

Located in the Lombardia region of northern Italy, the Po Valley demo showcases a dynamic landscape surrounding Milan. The goal of the Italian demo is to establish urban forests on former agricultural lands surrounding Milan with a mixture of tree and shrub species. Various planting density schemes were tested.

This Italian projection report is part of the deliverable D6.5 on projected ecosystem data. The forest development under varying restoration scenarios was projected for the upcoming 30-years, till 2055, using the EFISCEN-Space and FastTrack models.

With the EFISCEN-Space model, three scenarios were simulated. The first is the business as usual (BAU) scenario, in which the current forest area continues to develop under current forest management practices. In the first restoration scenario, 3600 ha are afforested with a planting density of 2000 trees per ha. In the second restoration scenario 3600 ha are also afforested with a planting density of 800 trees per ha.

With the FastTrack model, three additional scenarios were simulated, testing different planting densities with 1500, 2000 and 2500 trees per ha.

The models' projections showed that the best planting density for the Italian demo is 2500 trees per hectare in terms of maximizing carbon capture over 40 years and Hill-diversity and, although the EFISCEN-Space simulations results show no big differences between scenarios at a larger scale, the afforestation of 3600 ha will have an impact locally.



DEMO INFORMATION

Located in the Lombardia region of northern Italy, the Po Valley demo showcases a dynamic landscape surrounding Milan. Historically characterized by diverse bottomland forests, this area has undergone significant urbanization and agricultural development, resulting in the near extinction of its original forest cover. In response, the restoration initiative aims to create ecological buffers within the Milan Metropolitan Area, fostering a more natural environment and enhancing essential ecosystem services. Established in 1975, Parco Nord Milano occupies a strategic position in the metropolitan belt, encompassing former industrial and uncultivated lands across multiple municipalities. Over the years, the park has undertaken extensive reforestation efforts, with the planting of over 200,000 trees and shrubs. Serving as a vital habitat corridor, especially for birds, the park plays a crucial role as a "stepping stone" in biodiversity conservation efforts, facilitating the movement of fauna across the landscape.



Figure 1. Landscape and internal appearance of agricultural lands surrounding Milan.

The goal of the Italian demo is to establish urban forest on former agricultural lands surrounding Milan (Figure 1). These forests will serve as biodiversity hotspots, providing essential habitats for insects and other wildlife amidst a densely populated landscape. Additionally, the restoration efforts aim to reclaim permeable surfaces by de-sealing soils, mitigate high temperatures and heatwaves, absorb pollutants, and provide cultural, aesthetic, and recreational benefits to the local community. The upscaling potential in this

region was assessed where all areas in Lombardy classified by regional land use map as “degraded unvegetated” and “green uncultivated areas”, at elevations ≤ 600 m asl. were selected. We excluded forests, agricultural areas and urban areas of all kinds, as it is unlikely that proper forests (>0.2 ha) can be established here. The total area that came out of this assessment is 9937 hectares. Actual availability, ownership structure, and intentions of owners cannot be assessed at this point.



MODEL DESCRIPTION

EFISCEN-Space model

EFISCEN-Space is an empirical European forest model that simulates development of forest resources under varying scenarios of forest management and climate change. It keeps track of the development of the diameter distribution of 20 tree species (groups) for individual plot locations (Schelhaas et al., 2022). The diameter distribution changes over time due to the growth of trees (simulated by the growth of trees to a larger diameter class), the removal of trees due to natural (background) mortality or harvest, and the occurrence of new trees (ingrowth) in lowest diameter classes. The EFISCEN-Space model is initialised on tree-wise observations from forest inventories, usually National Forest Inventories (NFIs), and driven by environmental datasets with pan-European coverage (Nabuurs et al., 2007, Schelhaas et al., 2022, Filipek et al., In prep). These data are used to initialize forest structure and are the basis for the model's detailed and dynamic (i.e. sensitive to forest structure) simulation of growth (Schelhaas et al., 2018). Growth is related to the current forest structure (plus the abiotic predictors), and as incorporated here under a RCP 4.5. scenario for all baseline (BAU) and restoration scenarios. As the growth functions are fitted on repeated NFIs with a wide range of sites and weather data this results in a climate sensitive growth function. EFISCEN-Space is not a process based model, but it incorporates climate sensitivity by linking its growth functions to annually downscaled weather data from the MPI-ESM1-2-LR global climate model under RCP 4.5. This means forest growth responds to the projected climate changes.

Planting, thinning and final felling can be carried out in EFISCEN-Space according to specified regimes. Natural mortality and harvesting can both be based on fixed regimes (based on repeated forest inventories), and on dynamic modules for natural mortality and ingrowth and simulating harvest using harvest rule patterns. Dynamic modules for mortality and ingrowth are both fitted on large sets of repeated NFI plot and tree wise data (Schelhaas et al in prep; König et al., 2025).

Model outputs provide information about forest resources (growing stock volume, increment, harvested volumes, biomass), carbon pools (biomass, litterfall and soil), biodiversity (number of large size trees, species composition, Gini index, deadwood).

FastTrack model

The FastTrack model was developed by Land Life to provide locally accurate CO₂ accumulation forecasts of mixed species planted reforestation projects across the globe. The model is an extension of the IPCC Tier 2 approach Eggleston et al (2006) with crown competition and tree density dynamics allowing forecasting of carbon capture of planting

configurations including planting, direct seeding and combinations thereof. A full description of the FastTrack model is presented in Kramer et al. (2024).

The Tier 2 methodology used in FastTrack to calculate CO₂ capture is performed by sequentially multiplying stem volume increment with wood density to obtain stem biomass increment, stem biomass increment with shoot-to-stem ratio to obtain above-ground woody tree biomass increment, above-ground woody tree biomass increment with root-to-shoot ratio to obtain below-ground woody tree biomass increment, and tree weight increment with wood carbon fraction to obtain tree carbon increment and tree carbon increment with CO₂-to-carbon ratio to obtain CO₂ capture. Finally, tree density was divided by 1000 kg/ton and summed over the tree species to obtain total CO₂ capture in tons per hectare. The different tree components are calculated in FastTrack to compare them with observations in the calibration process.

As crown competition was added to the IPCC Tier 2 approach, the assumptions in FastTrack are that (1) the maximum individual tree stem volume growth is attained when a species reaches its full canopy size, (2) maximum stand growth is reached when full canopy closure is attained.

To obtain high local accuracy, site-dependent, species-specific parameter values are estimated through calibration to representative local data. For that, the National Forest Inventories (NFIs) data is used and filtered according to the environmental conditions of the study site. The aim of the calibration is to determine parameter values such that unbiased forest growth is projected by FastTrack. See Kramer et al (2024) for the technical details of the calibration. These site-dependent, species-specific parameters are: maximum stem volume increment, maximum crown radius increment and maximum crown radius. Site-independent, species-specific parameters such as carbon fraction, wood density are obtained from the scientific literature and scientific databases including TRY (Kattge et al 2020), the Global Wood Density database (Zanne et al, 2009).

The FastTrack model is embedded in a graphical user interface that allows for the selection of representative NFI sites, and subsequent calibration and projection. The selection process is based on both geographic and environmental distance between the NFI site and the planting site, considering mean annual temperature (MAT), mean annual precipitation (MAP) and optionally soil classification, slope and aspect.

SCENARIO DESCRIPTION

EFISCEN-Space scenarios

For the baseline and alternative scenarios we used a subset of the Italian NFI-3 (2005-2015) measured in the Po Valley (Figure 2). In total we simulated for the Baseline scenario 153 plots which represent 158 224 ha of forest area (around 1.5% of the total Italian forest area).

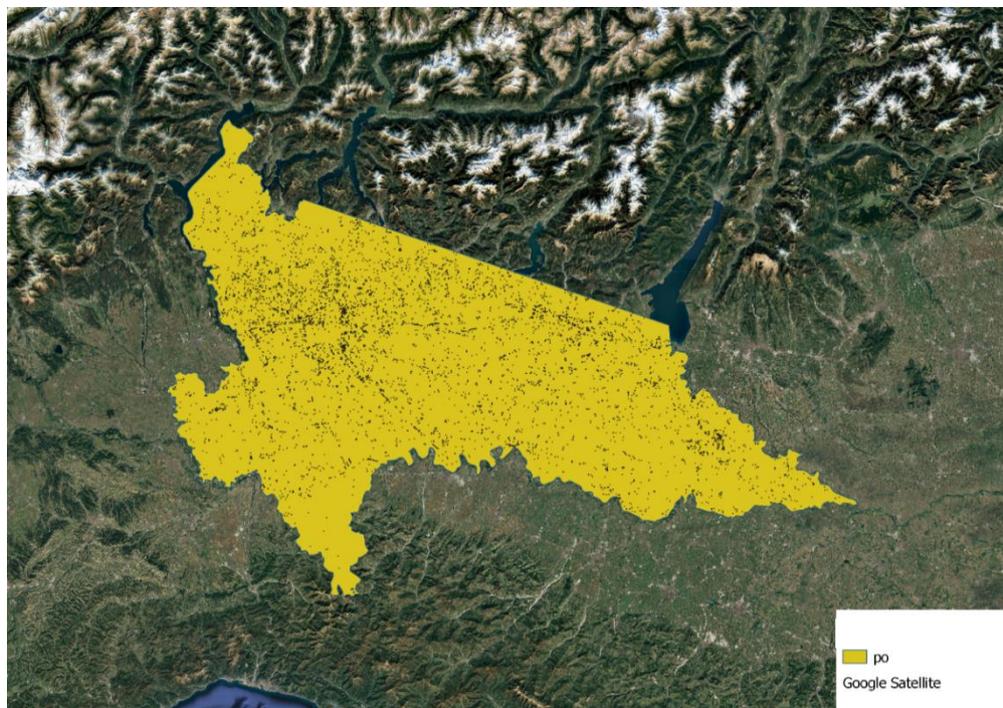


Figure 2. Map of the Po valley, the larger Italian demo area (yellow)

As the model was initialized on the latest processed NFI data, the model was first simulated to year 2025 with business-as-usual management to account for the forest development until 2025 (Figure 3). Then the state of the forest in 2025 was used to re-initialize and simulate the demo area from this common point in time considering other SUPERB demos.

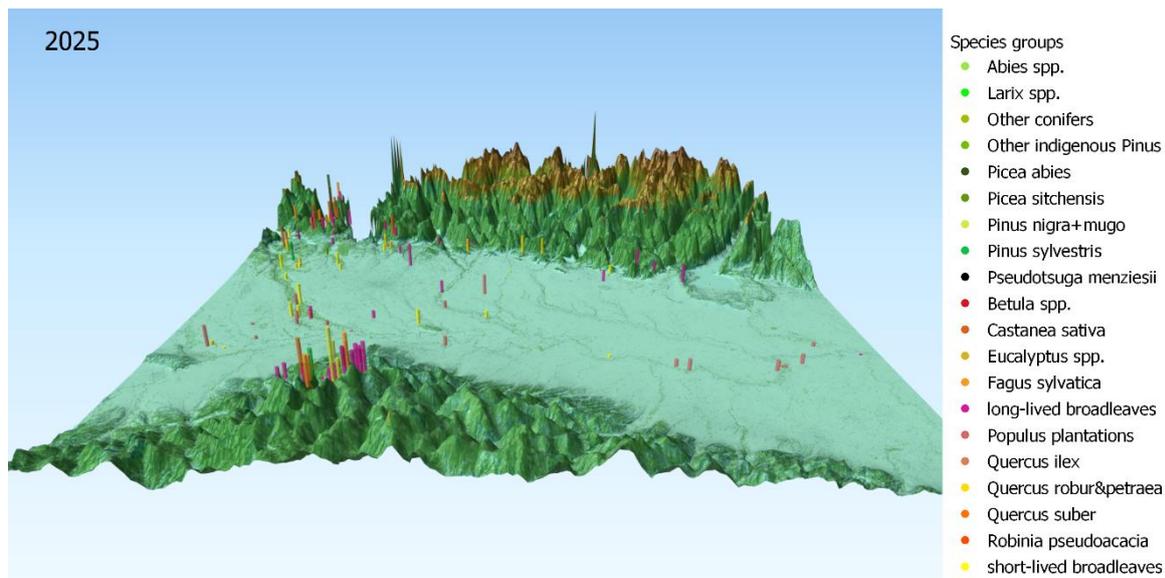


Figure 3. Map of initialized NFI plots in Italian demo, in total 153 plots. Color of the bar represents the initial dominant species or species group per plot, and height of the bar shows the initial growing stock volume (the higher the bar, the larger the growing stock volume).

As forest restoration measures need to be adaptive to climate change, both baseline and restoration scenarios were simulated under climate change scenario RCP4.5 (MPI-ESM1-2-LR). To represent forest dynamics, dynamic ingrowth and mortality were applied to all scenarios.

1. Baseline (BAU)

In the Baseline (BAU) scenario the development of the forest resources under current forest management is simulated. The current forest management was defined based on observed Spanish harvest rule patterns, due to lack of this information from the Italian data. The harvest rule patterns were described by two types of cutting types: thinning and final felling. The rules patterns were defined by a set of rules which included information about tree species, tree diameter class, stand basal area, number of trees per hectare, country and biogeographical region where the forest stand was located (Filipek et al., in prep; Feliciano et al., 2025). Each rule pattern included information about the probability of cutting, its intensity (e.g. amount of basal area removed from the forest stand) and its shape (e.g. thinning from below or from above, which emphasis cuttings of different cohorts of the forest stand diameter distribution).

2. Restoration scenario 1 – Afforestation closed canopy

In the first restoration scenario the actions in the Italian demo are scaled up to a larger area. We afforested in this scenario 3600 ha where a full crown development is expected. The

planting density is 2000 trees per ha. The species and species groups planted are *Robinia pseudoacacia*, *Populus*, *Quercus robur*, Long-lived broadleaves and Short-lived broadleaves.

Although *Robinia pseudoacacia* will never be planted due to legal restrictions, it is expected to appear naturally in the future. For this reason, it has been included in the planting scheme for the simulations. However, in the actual restoration actions done in the demo area, *Robinia pseudoacacia* is not included in the planting scheme.

The planting densities per species(group) can be found in table 1. In the afforested areas, no management is taking place after planting.

Table 1 Planting density for each species planted in Scenario 1

Species	Planting density (nr/ha)
<i>Robinia pseudoacacia</i>	100
<i>Populus</i>	100
<i>Quercus robur</i>	400
Long-lived broadleaves	800
Short-lived broadleaves	600
Total	2000

3. Restoration scenario 2 – Afforestation open forest areas

In this second restoration scenario the efforts of the Italian demo are also scaled up by afforesting 3600 ha. The Italian demo experimented with different planting densities. In this scenario, a different planting density is used compared to Scenario 1. Instead of 2000 trees per ha, the area is afforested with 800 trees per ha. Similar species(groups) are planted; *Robinia pseudoacacia*, *Populus*, *Quercus robur*, Long-lived broadleaves and Short-lived broadleaves. The planting densities per species can be found in table 2. No management is taking place after planting in the afforested areas

As mentioned in the previous restoration scenario, *Robinia pseudoacacia* is included in the simulations because it is expected to occur naturally. However, planting is not allowed and did not take place in the demo area.

Table 2 Planting density for each species planted in Scenario 2

Species	Planting density (nr/ha)
<i>Robinia pseudoacacia</i>	40
<i>Populus</i>	40
<i>Quercus robur</i>	160
Long-lived broadleaves	320
Short-lived broadleaves	240
Total	800



FastTrack scenarios

For the activity described by the Demo as 'find the best planting density', FastTrack simulates the tree planting at three different densities: 1.500, 2.000 and 2.500 trees/ha. The planting design comprises trees and shrubs. In FastTrack, this is modelled by creating two different stand types: although these plants are spatially mixed in the field, the model simulates competition only within each group (trees compete with trees, shrubs with shrubs), but not between trees and shrubs

Table 3. Planting design of the Italian demo's restoration actions simulated with FastTrack

Restoration action	Total action area (ha)	Planting density (tr/ha)	Tree species	Composition (%)	Shrub species	Composition (%)
Best planting density	11.75	1500, 2000 and 2500	<i>Acer campestre</i>	8	<i>Amelanchier ovalis</i>	4
			<i>Acer opalus</i>	5	<i>Berberis vulgaris</i>	4
			<i>Carpinus betulus</i>	5	<i>Cornus sanguinea</i>	9
			<i>Celtis australis</i>	8	<i>Coronilla emerus</i>	4
			<i>Fraxinus ornus</i>	6	<i>Cotinus coggygria</i>	9
			<i>Malus sylvestris</i>	6	<i>Crataegus monogyna</i>	9
			<i>Ostrya carpinifolia</i>	5	<i>Cystisus scoparius</i>	4
			<i>Platanus orientalis</i>	5	<i>Hippophae rhamnoides</i>	4
			<i>Prunus avium</i>	2	<i>Ligustrum vulgare</i>	4
			<i>Prunus cerasifera</i>	5	<i>Prunus spinosa</i>	9
			<i>Prunus mahaleb</i>	6	<i>Rhamnus catharticus</i>	4
			<i>Pyrus pyraster</i>	6	<i>Rhamnus saxatilis</i>	4
			<i>Quercus cerris</i>	9	<i>Rosa canina</i>	2
			<i>Quercus pubescens</i>	7	<i>Rosa gallica</i>	9
			<i>Quercus robur</i>	2	<i>Spartium junceum</i>	9
			<i>Sorbus domestica</i>	5	<i>Viburnum lantana</i>	9
			<i>Sorbus torminalis</i>	4	<i>total</i>	100
			<i>Tilia cordata</i>	5		
			<i>Ulmus laevis</i>	2		
			<i>Ulmus minor</i>	2		
<i>total</i>	100					



PROJECTION RESULTS

EFISCEN-Space

Growing stock

The growing stock (m^3/ha) for the BAU scenario and two alternative scenarios are shown in figure 4. Under all three scenarios, the growing stock (m^3/ha) gradually increases over time. The growing stock in the BAU (baseline) scenario increases from around $174 \text{ m}^3/\text{ha}$ to $219 \text{ m}^3/\text{ha}$. In both Scenario 1 (afforestation with 2000 trees per ha) and Scenario 2 (afforestation with 800 trees per ha), the initial growing stock is around $170 \text{ m}^3/\text{ha}$. By 2055, it increases to $226 \text{ m}^3/\text{ha}$ in Scenario 1 and $215 \text{ m}^3/\text{ha}$ in Scenario 2. The growing stock is higher in Scenario 1 due to the higher density of trees planted compared to Scenario 2.

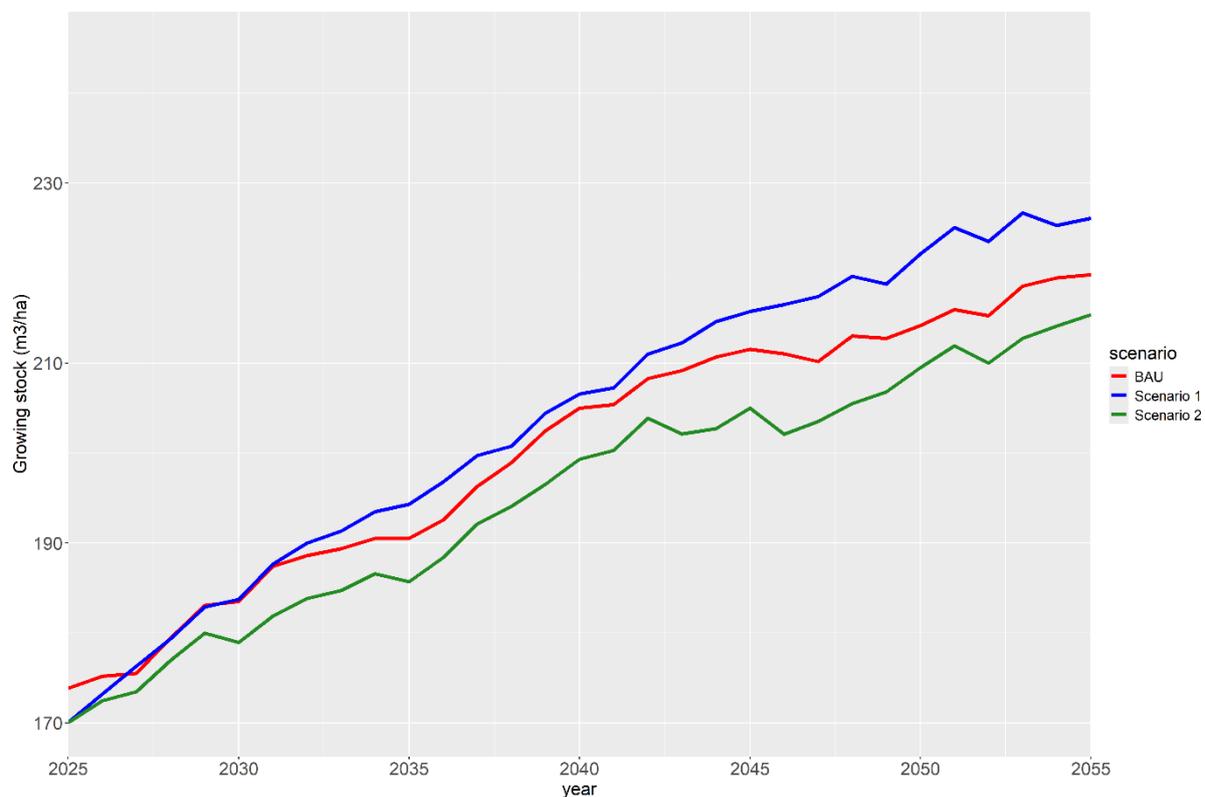


Figure 4 Growing stock (m^3/ha) development from 2025 till 2055 for the three different scenarios. In red BAU scenario, in blue Scenario 1 and in green Scenario 2.

Figure 5 shows the distribution of growing stock (m^3/ha) across diameter classes for different tree species, comparing the year 2025 with 2055 under the different scenarios. As the forest continues to grow over the years, the trees become bigger. This means that, for all three scenarios, more trees and thus volume can be found in the larger diameter classes per hectare. The diameter distribution looks similar in 2055 for the BAU scenario and Scenario 2.

The volume in diameter class 20-30 is a bit higher in 2055 compared to the BAU scenario and Scenario 1.

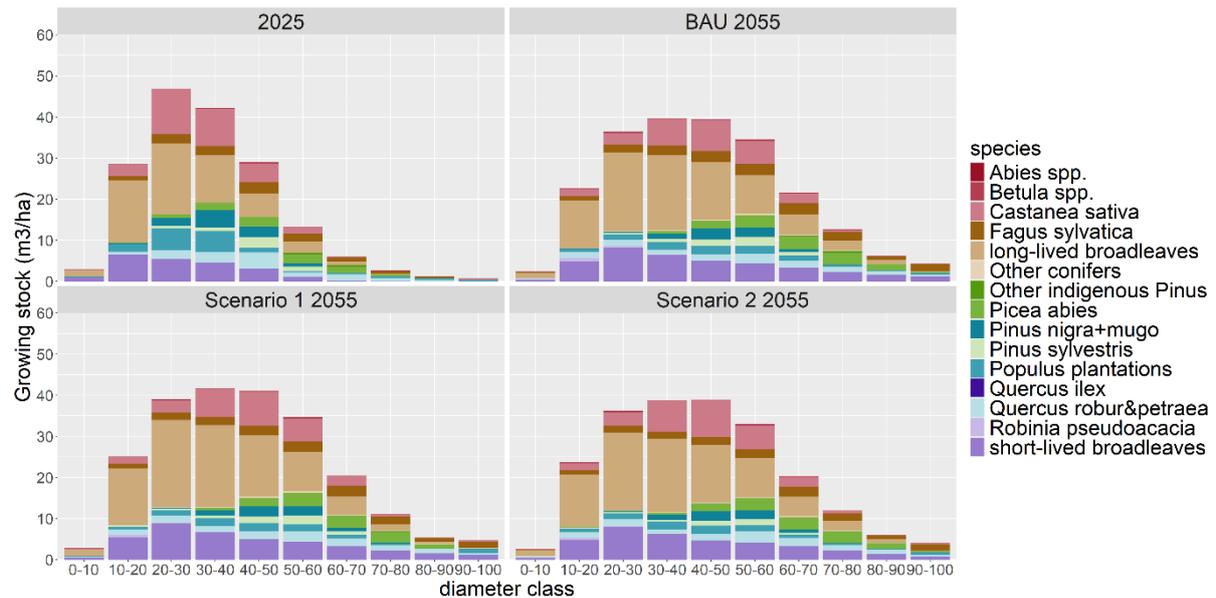


Figure 5 Growing stock (m^3/ha) per species and diameter class for the year 2025 and for the different scenarios in 2055.

Increment

The gross annual increment ($m^3/ha/yr$) for each of the scenarios is displayed in figure 6.

The increment (m^3/ha) differences between the scenarios are small. The higher planting density scenario (Scenario 1, blue) has a slightly higher gross increment (m^3/ha) compared to the lower planting density scenario (Scenario 2, green). On the afforested areas in Scenario 2, fewer trees are planted, which causes the lower increment per ha. At the start of the time series, the increment of the BAU scenario (red) is higher compared to scenario 1 and scenario 2 (Figure 4), caused by the newly planted hectares with small trees.

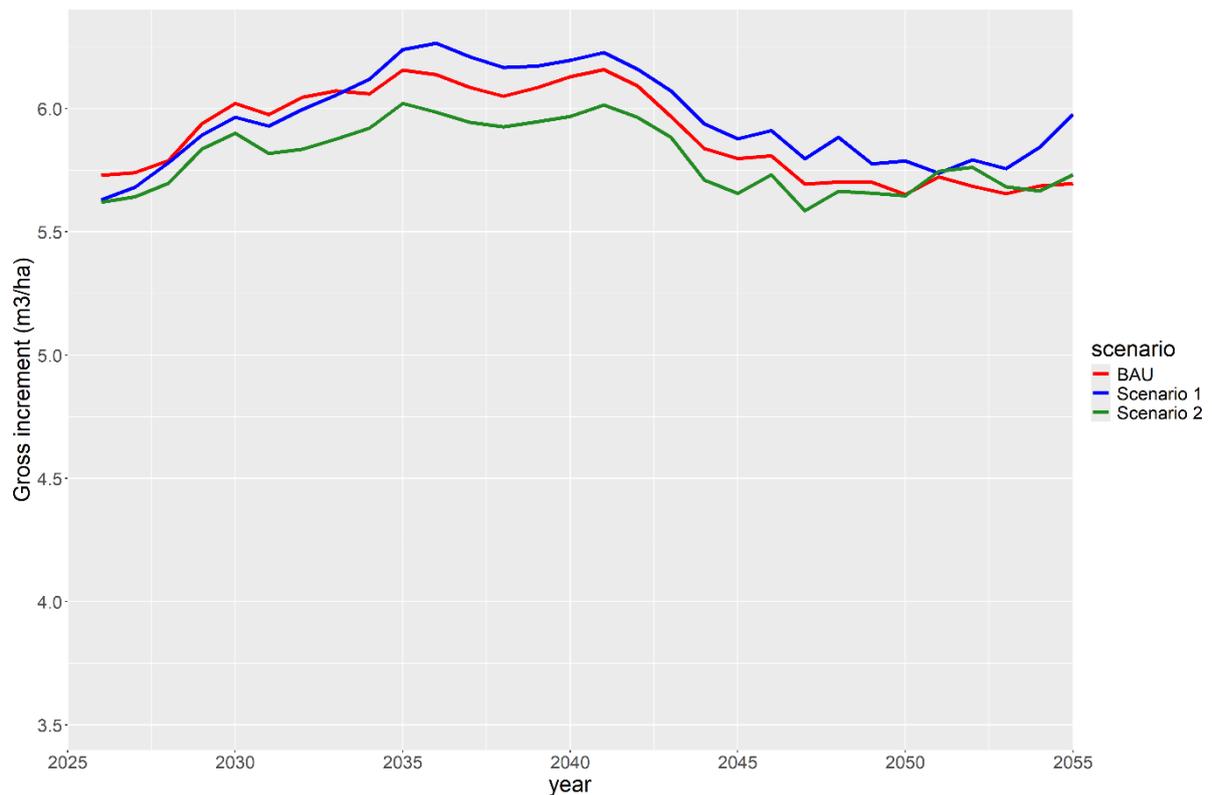


Figure 6 Gross annual increment (m^3/ha) over time for the three different scenarios. In red BAU scenario, in blue Scenario 1 and in green Scenario 2.

Mortality

The average mortality per year ($m^3/ha/year$) for the different scenarios, shown in figure 7, shares a higher mortality in the diameter classes 10 – 20 cm, 20 – 30 cm and 30 – 40 cm in Scenario 1 and Scenario 2 compared to the BAU scenario. The BAU scenario has a higher average mortality ($m^3/ha/year$) in the higher diameter classes from 50 – 60 cm onwards compared to the other two scenarios. The newly planted hectares don't have trees yet in these larger diameter classes in 2055. Mortality in the different diameter classes indicates a variety of sizes in dead wood.

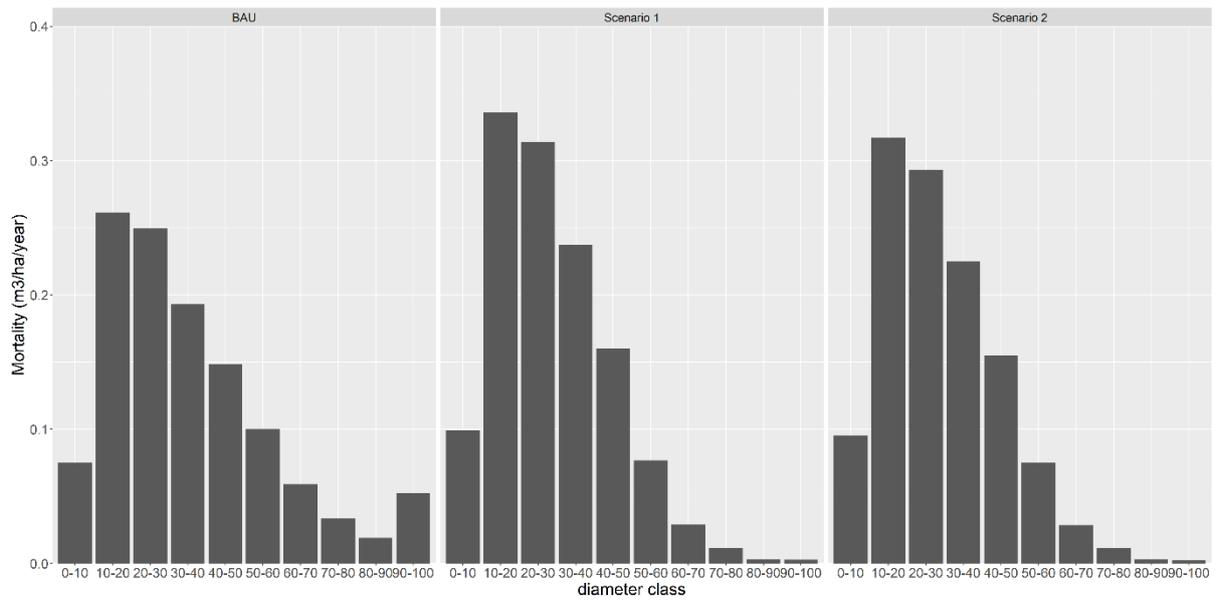


Figure 7 Mean mortality ($m^3/ha/year$) development over diameter classes (cm) for the three different scenarios. Mortality is estimated as the average over the 30-year simulation (from 2025 till 2055).

Gini index

The Gini index over the simulated period for each scenario is shown in figure 8. The Gini diversity index quantifies structural heterogeneity and is here applied to the diameter. A higher Gini index indicates greater heterogeneity in the distribution of tree sizes, indicating a more complex, heterogeneous forest structure. Scenario 1 and Scenario 2 have, at the beginning, a more heterogeneous forest structure, due to the planting of the young trees. From the year 2030 onwards, the GINI index stays around 0.5. The BAU scenario has a quite stable Gini index between 0.50 and 0.53 over the simulated 30 years.

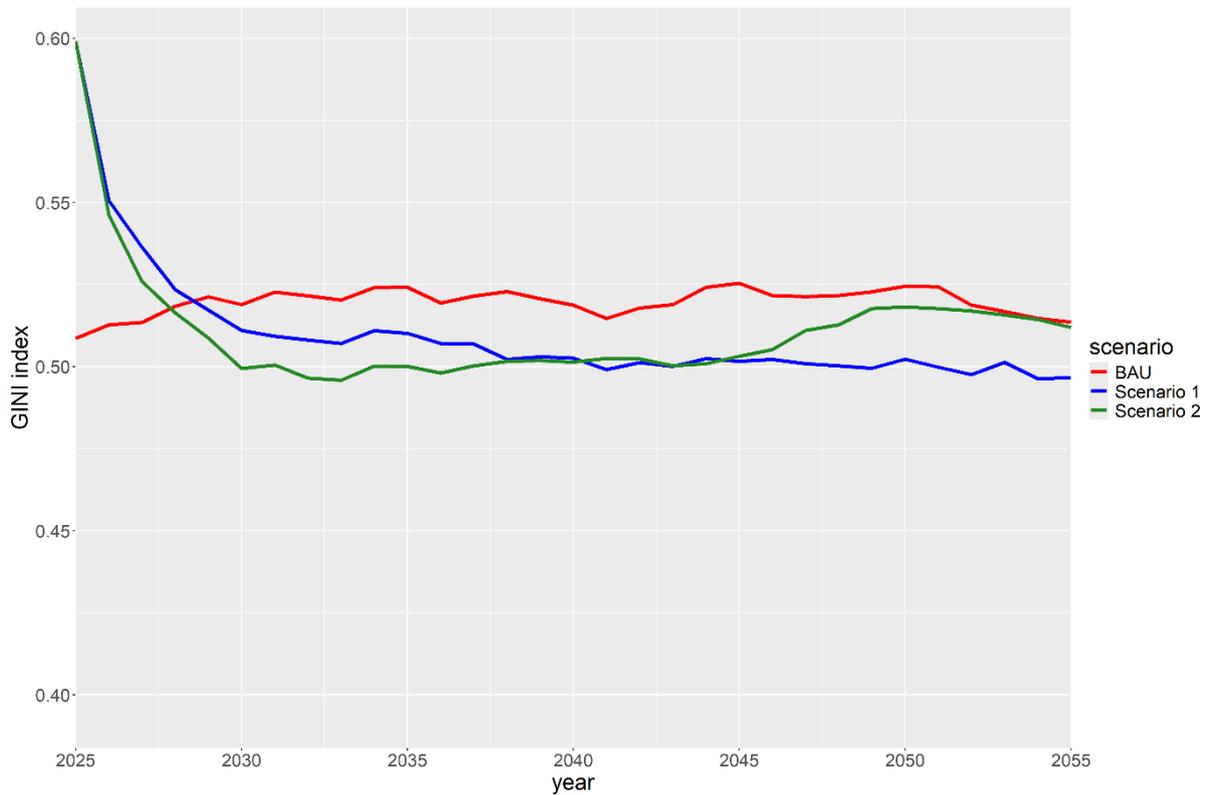


Figure 8 Gini index (inequality index) development for the three different scenarios over time. In red BAU scenario, in blue Scenario 1 and in green Scenario 2.

Soil organic carbon

Figure 9 shows the development of soil organic carbon stock (SOC) (ton C/ha) over time. Although the SOC is highest under the BAU scenario (red), all three scenarios follow a similar trend. First, all scenarios see an increase in SOC during the first years, after which the SOC declines until around 2040. From 2040 till 2055 the SOC recovers slightly under all scenarios. The starting condition for each scenario is different. EFISCEN-Space uses Yasso15 to model the SOC. In Yasso15, a spin-up phase is used to bring the SOC into equilibrium based on the described scenarios, resulting in different starting conditions. In addition, extra hectares are planted in the alternative scenarios.

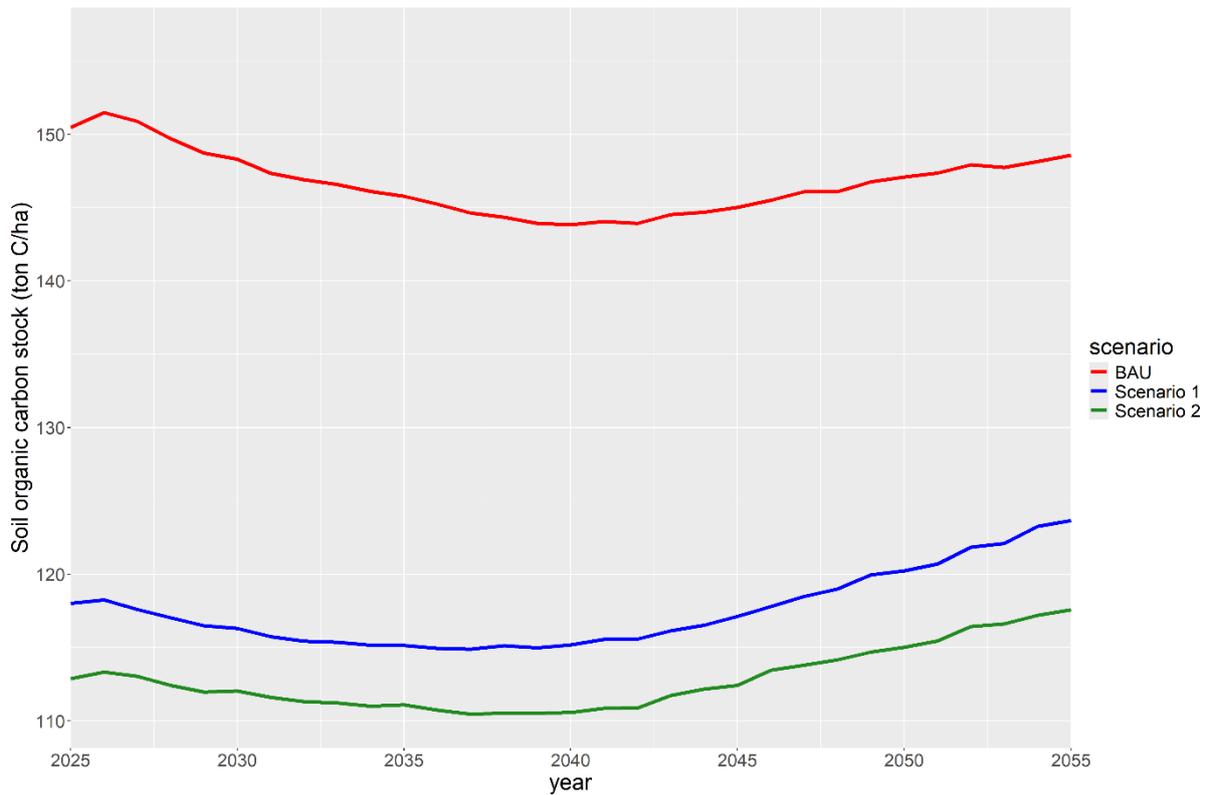
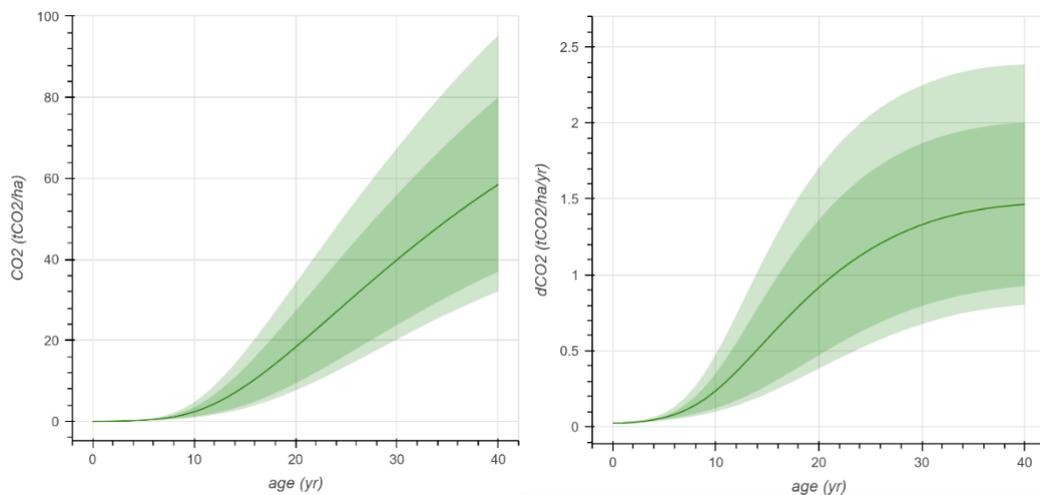


Figure 9 Soil organic carbon (SOC; ton C/ha) development over time for the three different scenarios. In red BAU scenario, in blue Scenario 1 and in green Scenario 2. The SOC was simulated using Yasso15 model (Järvenpää et al., 2018) coupled with EFISCEN-Space.

FastTrack

Carbon capture results

1. 1500 trees/ha



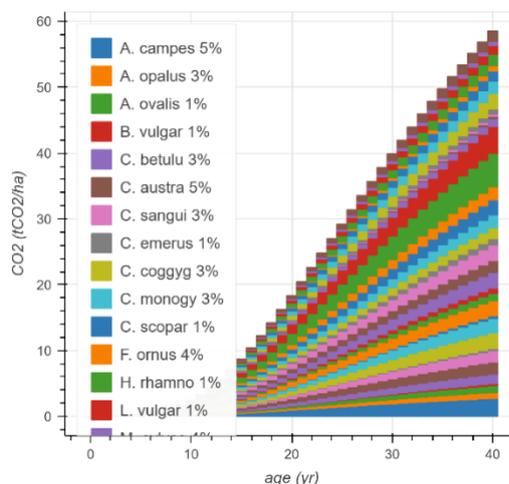
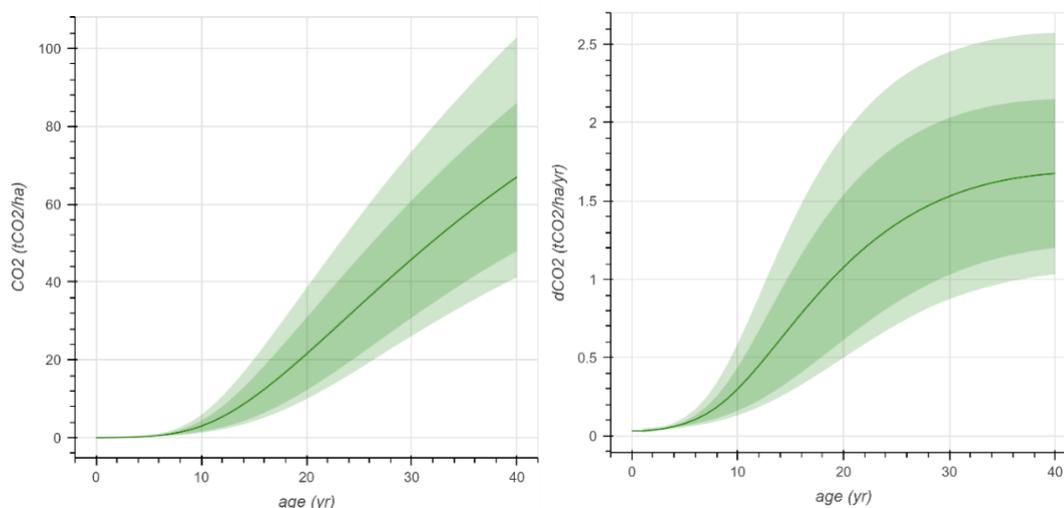


Figure FT1. Carbon capture results for the tree planting at 1500 tr/ha density scenario. On the left, the CO₂ accumulation over 40 years in tCO₂/ha. On the right, the annual CO₂ capture over 40 years in tCO₂/ha/yr. At the bottom graph, the species-specific carbon capture contribution in percentage.

The carbon capture for the planting at 1500 trees per hectare is estimated to be **58.54 tons of CO₂ per hectare over 40 years**, or **1.46 tons of CO₂ per hectare** on average every year over a 40-year period. As shown in the right figure FT1, the species contribution is relatively homogeneously distributed over the 36 species that make up the design of this scenario.

2. 2000 trees/ha



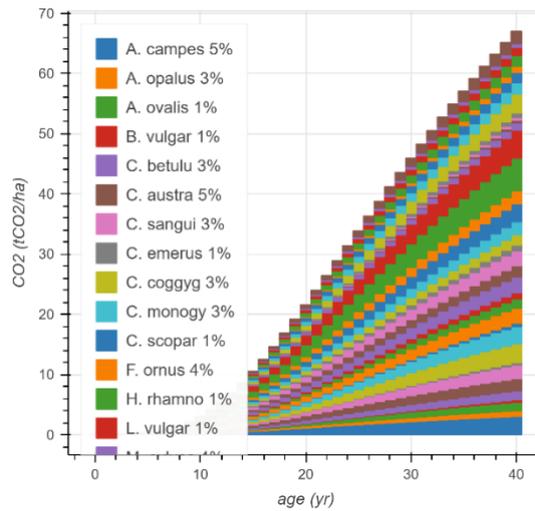
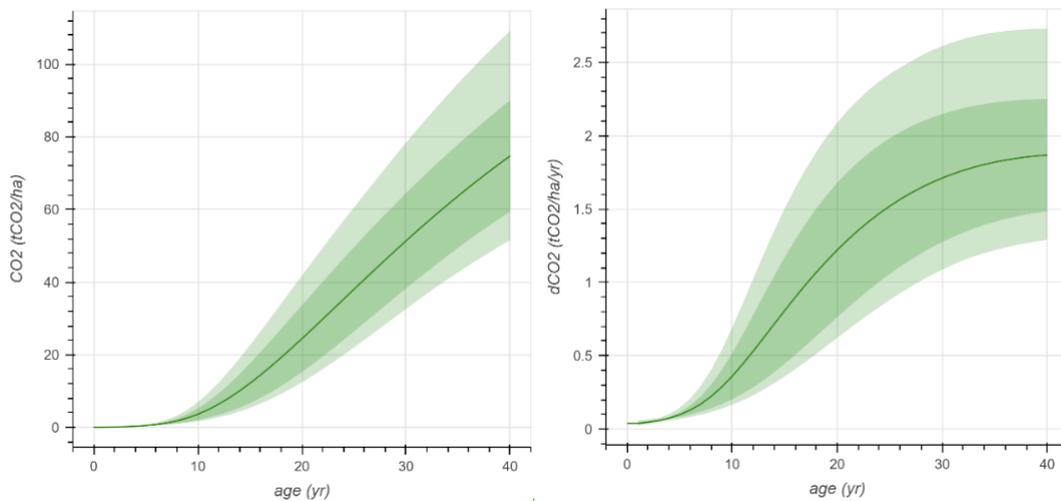


Figure FT2. Carbon capture results for the tree planting in the 2000 tr/ha density scenario. On the left, the CO₂ accumulation over 40 years in tCO₂/ha. On the right, the annual CO₂ capture over 40 years in tCO₂/ha/yr. At the bottom graph, the species-specific carbon capture contribution in percentage.

The carbon capture for the planting at 2000 trees per hectare is estimated to be **67.00 tons of CO₂ per hectare over 40 years**, or **1.67 tons of CO₂ per hectare** on average every year over a 40-year period. As shown in the right figure FT2, the species contribution is homogeneously distributed among the 36 species that make up the design of this scenario.

3. 2500 trees/ha



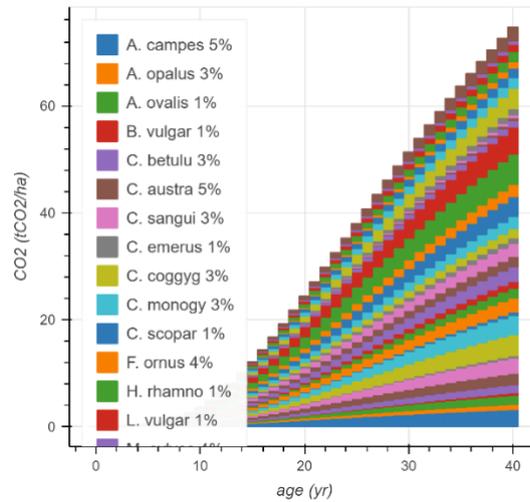


Figure FT3. Carbon capture results for the tree planting at 2500 tr/ha density scenario. On the left, the CO₂ accumulation over 40 years in tCO₂/ha. On the right, the annual CO₂ capture over 40 years in tCO₂/ha/yr. At the bottom graph, the species-specific carbon capture contribution in percentage.

The carbon capture for the planting at 2500 trees per hectare is estimated to be **74.73 tons of CO₂ per hectare over 40 years**, or **1.87 tons of CO₂ per hectare** on average every year over a 40-year period. As shown in the right figure FT₃, the species contribution is homogeneously distributed over the 36 species that make up the design of this scenario.

Interestingly, and common to all planting scenarios is that some species, despite having the same abundance as others in the planting mix (same % in mix composition), are contributing more to the cumulative carbon capture at year 40 than others. This is not very evident from the graphs due to the big number of species in the Italian demo design, but for example *Amelanchier ovalis* and *Berberis vulgaris* (see figure F₄ below) show this difference.

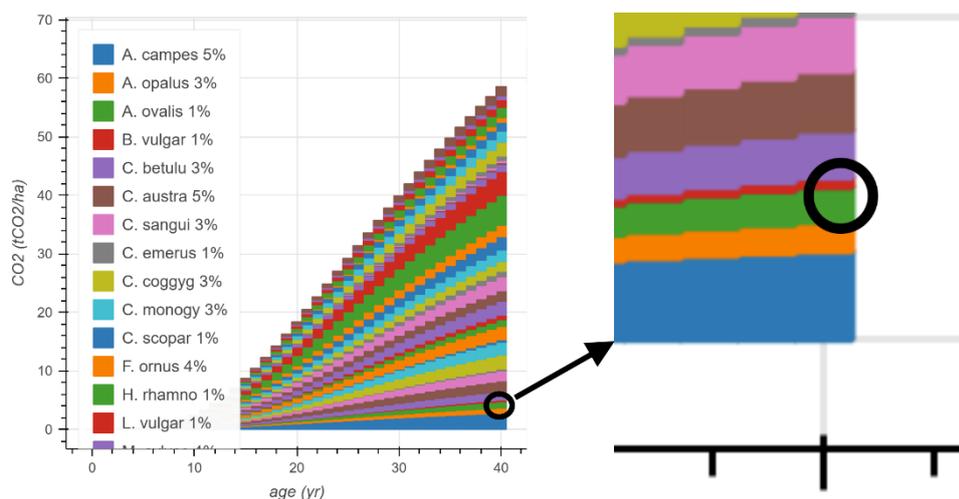


Figure Ft4. Zoom in the carbon contribution of the species *Amelanchier ovalis* (green) and *Berberis vulgaris* (red). Both are present with the same abundance in the species mix (1%) but show different carbon capture contributions at year 40 of the projection.

This is because *Amelanchier ovalis* grows bigger than *Berberis vulgaris* at this site over the projected period. Some of the important factors affecting the species' contribution difference include trait differences (e.g. wood density), growth patterns, and the environmental conditions of the site. Hence, when planning restoration projects where carbon capture is a relevant ecosystem service to assess or enhance, the consideration of the species growth at the study area is crucial for the optimising of the planting designs.

Species diversity results

Given that the three planting scenarios are composed of the same species mix (same number of species), the results show that the effective species richness increases with increasing planting density (Fig. H1). Since the proportion of each species abundance in the planting mix is not the same (ranges from 1 to 9% depending on the species), the theoretical maximum species richness of 36 (total number of species in the mix) is not attained.

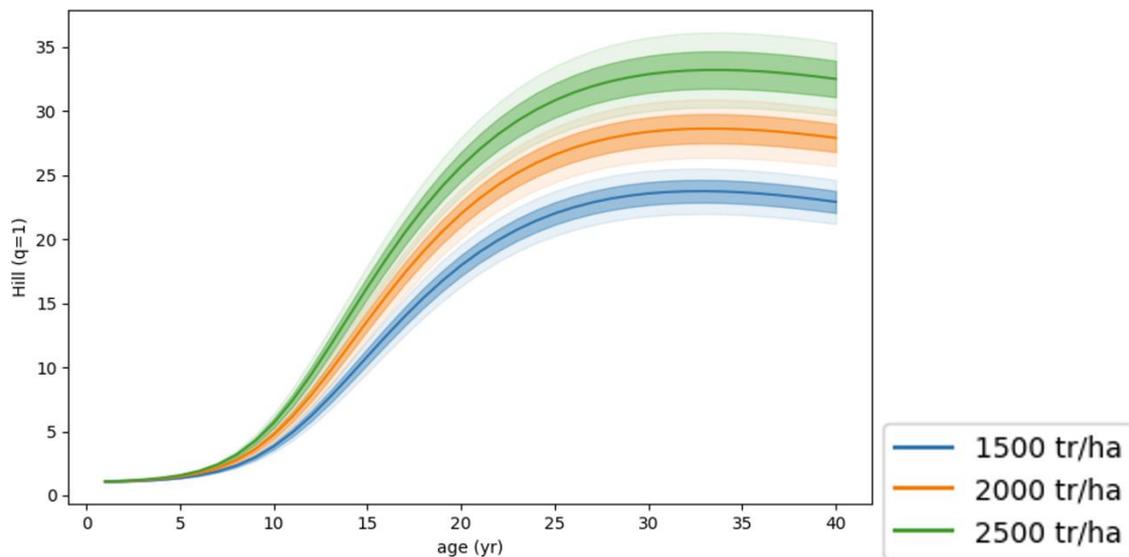


Figure H1. Time evolution of Hill diversity ($q=1$) for the different density scenarios

Summary of FastTrack results

The findings of the FastTrack's simulations are summarized in Table 2. With an increase in planting density, there is an increase in the carbon capture per hectare (at the stand level), while the carbon capture per tree decreases. This means that the higher the density, the thinner the trees grow, but this still results in higher cumulative CO₂ capture per hectare. On a relative scale, an increase in tree density of 67% (from 1500 to 2500 tr/ha) results in an increase in per-area carbon capture of 28%.

Given an equivalent planting mix and a high species richness over scenarios, the consequence of the different planting densities on the Hill-diversity is that, this metric increases with increasing planting density across all scenarios.

At these densities and planting designs with such high species richness, there is a proportional increase in both carbon capture and Hill-diversity with tree density.

Table 4. Carbon capture projections and Hill diversity values for the different forest restoration scenarios. The percentage of Hill diversity value of the theoretical maximum (perfect evenness over all species) is presented between brackets.*

Planting density (tr/ha)	Cumulative alive biomass carbon capture (tCO₂/ha/40yrs)	Mean annual alive biomass carbon capture (tCO₂/ha/yr)	Cumulative carbon capture per tree (tCO₂/tree/40yrs)	Hill (q=1, at t=40)
1500	58.54	1.46	0.040	23.0 (63.9%)
2000	67.00	1.67	0.034	27.9 (77.5%)
2500	74.73	1.87	0.029	32.6 (90.6%)



KEY FINDINGS

Key finding #1

The mean annual CO₂ capture for the planting restoration scenarios carried out at the Italian demo area with Fasttrack ranges from 1.5 to 1.9 tCO₂/ha/yr. This result depends strongly on the chosen planting density.



Key finding #2

Tree diversity based on Hill diversity for the planting restoration scenarios of the Italian demo with Fasttrack shows that this biodiversity metric increases with increasing planting density.

Hill-diversity can be used to compare the effective diversity across different forest restoration actions.



Key finding #3

A comparison of the scenarios in the Italian demo area (158 224 ha of forest and 3600 ha of afforested area in the alternative scenarios) shows that there are no major differences between the three scenarios, considering growing stock (m³/ha), increment (m³/ha/yr) and species composition can be found. All three scenarios have a steady increase in growing stock and a development of the diameter distribution towards larger trees.



RECOMMENDATIONS

Takeaway #1

In terms of maximizing carbon capture over 40 years and Hill-diversity, the best planting density for the Italian demo is 2500 trees per hectare.



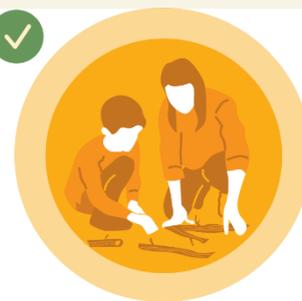
Takeaway #2

Different tree species contribute significantly differently than others to the total carbon capture of a forest. When aiming at carbon capture optimization among other restoration goals, consider some of the important factors affecting the species contribution difference: planting density, trait differences (e.g. wood density), growth patterns, or the environmental conditions of the site.



Takeaway #3

Although the results show no major differences in the scenarios simulated with EFISCEN-Space, the afforestation of 3600 ha will have an impact locally. Planting only 800 trees per hectare results in only a slightly lower growing stock per hectare. Considering this, it could be feasible to use the same planting costs as for 2000 trees per hectare to restore a larger area, taking into account only the planting costs. The average actual restoration costs in the Italian demo were around €28 000 per ha (based on information given in version 2 of the Italian workplan), which could be lower with lower planting densities.



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