(Projects funded under the Call 2014 onwards must use this format)

LIFE Project Number

LIFE19 ENV/DE/000123

Final Report

Covering the project activities from 01/09/2020[1] to 30/06/2024

Reporting Date[2]

30/09/2024 / Resubmission 15/02/2025

LIFE PROJECT NAME or Acronym

Future Forest

Data Project	
Project location:	Landsberg am Lech, Bayern
Project start date:	01/09/2020
Project end date:	31/12/2023 **Extension date:** <30/06/2024 >
Total budget:	€ 1.444.244
EU contribution:	€ 711.698
(%) of eligible costs:	50,73

Data Beneficiary	
Name Beneficiary:	County administration Landsberg am Lech
Contact person:	Mr. Rainer Mahl
Postal address:	Von-Kühlmann-Straße 15, 86899 Landsberg am Lech, Germany
Telephone:	49-8191-129-1501
E-mail:	futureforest@lra-ll.bayern.de
Project Website:	www.futureforest-landkreis-landsberg.de

[1] Project start date

[2] Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

This table comprises an essential part of the report and should be filled in before submission

Please note that the evaluation of your report may only commence if the package complies with all the elements in this receivability check. The evaluation will be stopped if any obligatory elements are missing.

Package completeness and correctness check	
Obligatory elements	**✓ or N/A**
Technical report	
The correct latest template for the type of project (e.g., traditional) has been followed and all sections have been filled in, in English *In electronic version only*	OK
Index of deliverables with short description annexed, in English *In electronic version only*	tbc
Mid-term report: Deliverables due in the reporting period (from project start) annexed Final report: Deliverables not already submitted with the MTR annexed including the Layman's report and after-LIFE plan Deliverables in language(s) other than English include a summary in English *In electronic version only*	tbc
Financial report	
The reporting period in the financial report (consolidated financial statement **and** financial statement of each Individual Beneficiary) is the same as in the technical report with the exception of any terminated beneficiary for which the end period should be the date of the termination.	OK
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets + full Excel file)*	OK
Financial Statement(s) of the Coordinating Beneficiary, of each Associated Beneficiary and of each affiliate (if involved), with all forms duly filled in (signed and dated). The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. *In electronic version (pdfs of signed sheets + full Excel files) + in the case of the Final report the overall summary forms of each beneficiary electronically Q-signed or if paper submission, signed and dated originals**	OK
Amounts, names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement)	OK
Mid-term report (for all projects except IPs): the threshold for the second pre-financing payment has been reached	n/a
Beneficiary's certificate for Durable Goods included (if required, i.e. beneficiaries claiming 100% cost for durable goods) *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets)*	StadtL
Certificate on financial statements (if required, i.e. for beneficiaries with EU contribution ≥750,000 € in the budget) *Electronically Q-signed or if paper submission signed original and in electronic version (pdf)*	n/a
Other checks	
Additional information / clarifications and supporting documents requested in previous letters from the Agency (unless already submitted or not yet due) *In electronic version only*	Within Chapter 6
This table, page 2 of the Mid-term / Final report, is completed - each tick box is filled in *In electronic version only*	OK

**Signature by a legal or statutory representative of the beneficiary / affiliate concerned*

Instructions:

Please refer to the General Conditions annexed to your grant agreement for the contractual requirements concerning a Mid-term/Final Report.

Both Mid-term and Final Technical Reports shall report on progress from the project start-date. The Final Report must be submitted to the Agency no later than 3 months after the project end date.

Please follow the reporting instructions concerning your technical report, deliverables and financial report that are described in the document Guidance on how to report on your LIFE 2014-2020 project, available on the LIFE website. Please check if you have the latest version of the guidance as it is regularly updated. Additional guidance concerning deliverables, including the layman's report and after-LIFE plan, are given at the end of this reporting template.

Regarding the length of your report, try to adhere to the suggested number of pages while providing all the required information as described in the guidance per section within this template.

1. Table of contents

List of Figures and Pictures

List of tables

2. List of keywords and abbreviations

AB	Associated Beneficiary
CoB	Coordinating Beneficiary
DE	Germany
Del	Deliverable
e.V.	eingetragener Verein (engl. Registrated association)
IG	Interessensgemeinschaft (engl. Community of Interest)
HSWT	AB Hochschule Weihenstephan-Triesdorf
LandkreisL	CoB Landsberg am Lech
LENA	Landsberger Energieagentur (engl. Landsberg Energy Agency)
PP	Project Partner
StadtL	AB Stadt Landsberg am Lech
Tbd	to be developed
TU	Technical University
WBV	Forest owner association (Waldbesitzervereinigung)

3. Executive Summary (maximum 2 pages)

Briefly describe the project objectives, key deliverables, and outputs.
Compare in a few paragraphs the activities planned to the progress made. Summarise the achievements, deviations, important problems, and difficulties met during the project implementation. This summary should be a stand-alone text.

LIFE Future Forest – project objectives, key deliverables, and outputs

The LIFE Future Forest Project in Landsberg am Lech, Germany, is an environmental light-house project that wants to contribute to the EU-wide acceptance and implementation of sustainable forest and soil management by demonstrating a new approach on local level. This overarching objective is accompanied by four more specific objectives:

1) Adapted local action contributing to EU-wide ecological restructuring of forests
2) Contribution to measurement and valorisation of ecosystem services (e.g., wood quantity and quality, better aerated soil, biodiversity, water retention, CO_2 storage capacity, drinking water availability
3) Cross-sectoral valorisation of ecosystem services leading to socioeconomic benefits
4) Anchoring sustainable forest management and the socioeconomic cycles in the wider network for replication

Key deliverable is, next to a successful implementation of afforestation and maintenance for sustainable forests and soils on the one hand and of a valorisation system for municipal ecosystem services on the other hand, a handbook that will focus on an affordable and practicable orientation towards sustainable forest and soil conversion replicating the Future Forest approach with custom-fit measures for municipalities own conditions. It will also include the self-assessment tool for municipalities to evaluate their framework conditions and guidance to set up valorisation systems for municipal ecosystem services.

Activities achieved

All actions from the Grant Agreement were implemented within the prolongated project lifetime.
The B-Actions on implementation were worked on leading to the development of a self-assessment-tool (B.1) which was set up as an online tool (app) for easier usage. In B.2, the project worked on reforestation, maintenance, and monitoring measures on the Future Forest areas on a total of 403 ha of forest land that was systematically assessed, improved, and expanded according to sustainable forest management principles. The area includes both the structured continuation of historical piloting efforts and the integration of newly reforested sections, ensuring a meaningful contribution to increasing sustainable forest management in the region. During the project period around 66.904 plants were already carried out in all municipalities and in private forests, of which around 75 percent are deciduous trees and 15 percent are conifers. Those trees were planted on more than 325 ha of land (non-sustainable forest). A total of 77,5 hectares were thinned, whereby four with a harvester with debarking head equipment. Another area in Kaufering of 2,5 ha was converted into an energy composite forest. Furthermore, all project forests were maintained according to the concept of stability, permanent mixed forest, natural regeneration, high soil capacity and high root capacity. Additionally, the monitoring-equipment was followed up on different indicators, e.g biomass growth of trees via dendrometer. For B.3, the valorisation systems on CO2 and ecosystem services was established in a simplified way in the municipality of

Fuchstal. The one on water incentives could not be implemented, however was theoretically tested in the municipality of Schwabhausen/Weil.
A great success can be named within the D-Actions on communication, where the project can report a high over-achievement of targets as the project team, especially the forester Ludwig Pertl (from AB StadtL), was widely connected to different networks – both political as regarding the topics soil & forest): EUSALP AG6, Alpine Convention Soil Working Group, Alpine Soil Partnership, EU Mission Soil, "IG Gesunder Boden" (Community of Interest in healthy soils), "Aufbauende Landwirtschaft" (Building Agriculture), Organic farmers in Germany, (Chairman Sepp Braun), and welfare economy Landsberg.) This led to a high number of project promotion and information in press, radio, TV, and social media, e.g. with the famous Youtuber Rigotti. Next to this, since 2022, five "Soil and forest event weeks" with students from HSWT took place, combining informational events on the project and results for interested stakeholders.
As key deliverable, the Future Forest handbook (E.2) was developed and distributed to relevant stakeholders. Furthermore, the laymen report (D.1), a short version which acts as practical guide for forest owners, was developed, ensuring the distribution on how to adapt the forest.

Deviations / Problems / Difficulties: Implementation of Action B.3
As already mentioned in the Mid Term report, the valorisation system focusing on the sequestration of CO_2 was expanded and thus improved towards ecosystem services. This shows the speciality LIFE Future Forest promoted with its approach.

When it comes to the implementation of the valorisation system, the team had to face the challenge that a committed company (Hirschvogel) withdraw their support only on short notice leaving the team without funding in front of the forest owners of Fuchstal, where the system was tested first. Due to the short time available, it was not possible to find any other sponsors. In order not to jeopardise the implementation of the pilot in Fuchstal, it was essential to find a feasible solution in the short time available. The municipality of Fuchstal itself and its mayor, Mr Karg, were prepared to provide premiums of up to EUR 10,000. Due to this change, the planned realisation of a Future Forest Association was abandoned, and it was decided to transfer the sums directly from the municipality of Fuchstal to the forest owners (legally the most uncontroversial solution) leading to a simplified version of the Future Forest Funds (B.3)

The implementation of the valorisation system of the water incentives turned out to be challenging, too. Due to the increase of prices after Covid and Ukraine war and the time period of elections, no political support was given on increasing the water prices for end users to compensate for sustainable forest management. The team tried in several attempts, but during the project lifetime no implementation could take place. However, the system was theoretically tested in Schwabhausen/Weil, where the mayor is interested to implement the system and the project team received positive feedback from other municipalities to be interested in implementation. Furthermore, it will be implemented within a replication approach in Brandeburg starting 2025.

4. Introduction (maximum 2 pages)

- Description of background, problems, and objectives (as foreseen in the proposal)
    - For LIFE Environment & Resource Efficiency:
        - Environmental problem/issue addressed
        - Outline the hypothesis to be demonstrated / verified by the project
        - Description of the technical / methodological solution
        - Expected results and environmental benefits

Under the pressure of climate change, the current forest management focusing on softwood are no longer sustainable. Due to decreasing water availability, the softwood forests (mainly spruce) can no longer ensure healthy trees (due to their shallow roots) which will lead to immense decrease of the future productivity and health of soft forests.
This deterioration will eventually lead to a loss of other highly relevant services as the decreasing water availability and quality, higher vulnerability to the bark beetle, and pure soils with poor biodiversity potential and smaller water retention and filter function.
Due to the lack of convincing evidence, socioeconomic calculation models and missing capacity to bring different sectors together, it is of main relevance to target the environmental issue of unsustainable forest due to the long-term impact to soils, water, and their ecosystem services.

The objective of LIFE Future Forest was to contribute to the EU-wide acceptance, mainstreaming and implementation of more sustainable management approaches for forests and soils by:

- Contributing to restructuring forests through adapted local actions
- Contributing to the measuring and valorisation of ecosystem services (wood quantity and quality, better aerated soils, biodiversity, water retention capacity, CO_2 storage capacity, drinking water availability)
- Grasping socioeconomic benefits via valorisation of the ecosystem services and
- Anchoring the valorisation in a wider network

To implement this aims, LIFE Future Forest aimed to

- create an instrument for regional self-assessment including a replicable framework (Action B.1)
- demonstrate afforestation and maintenance measures for sustainable forests and soils (Action B.2)
- set up valorisation systems for municipal ecosystem services and model of the results for integration in political decision-making (Action B.3)
- monitor relevant indicators to provide convincing evidence supporting the project aim (Action C.1)
- disseminate the results and project relevance from local to EU-wide level raising awareness and building capacity via workshops and forest weeks (Actions D.1-3)
- set up a long-term communication and replication plan (Action E.2)

Expected results aimed for were

- for environmental issues (on demonstration sites)

    - the increase of area with sustainable forest management by 50 ha
    - the increase of fine roots for improved CO_2 storage capacity by 24tons/ha
    - the increased amount of earthworms (as indicator for improved biodiversity) by at least 20 per sqm
- socioeconomic benefits as
    - improved quality of life for inhabitants due to improved water retention, cooling, and soil quality
    - upgraded jobs through the integration of sustainable forest practices and valorisation systems into the socioeconomic cycle of municipalities
- political impact and replication by
    - awareness raising for entities in different sectors and political decision-makers via dissemination, capacity building and a designed self-assessment tool
    - setting up concrete orientation through a handbook for municipalities to copy the approach of LIFE Future Forest to their own conditions, whereby all 31 municipalities of the county will receive this information.

Expected longer term results aimed for (as anticipated at the start of the project)

- LIFE Environment & Resource Efficiency: e.g., future contribution to the implementation, updating and development of European Union environmental policy and legislation, including the integration of the environment into other policies, replicability, and transferability of demonstrated technology; market strategy and economic feasibility

To guarantee the long-term impact of the LIFE Future Forest project, it is important to focus on both local/practical activities, as well as on political activities.
By elaborating a handbook for municipalities, instructions are provided for regions which want to adapt to the sustainable forest management after the model of LIFE Future Forest. Furthermore, the implementation of this model including the valorisation of the ecosystem services, the county Landsberg am Lech reaches a more integrated, co-operative and more conflict resilient local sustainable forest management on the one hand, demonstrating the effectiveness and positive impacts of this win-win situation for wood economy and ecosystem services on the other.
When it comes to political activities, EU-wide policy networks were aimed to be influenced. Here, LIFE Future Forest drew on the Alpine Soil Partnership and the Alpine Soil information network (with set up during the INTERREG Alpine Space project Links4Soils), using their knowledge, contacts, and political influence to increase the focus on the necessity of sustainable forest and soil management
Eventually, already during the writing of the project proposal, EUSALP and the Alpine Convention showed their interest in the project and will include the approach into the soil conservation protocol (Alpine Convention) and the work of AG2, AG6 and AG7 (EUSALP). This will guarantee an EU-wide and long-term use of the LIFE Future Forest outcomes.

5. Administrative part (maximum 1 page)

Please briefly describe the following issues:

- The project management process, the working method, the problems encountered, the partnerships and their added value, including comments on any significant deviations from the work plan.
- Communication with the Agency and Monitoring team.
- The changes due to amendments to the Grant Agreement.

Project management process, working method (incl. improvements), added value of partnership

The Partner consortium met on regular basis: Online Jour Fixes took place every 2-4 weeks depending on the need of exchange, and on-site meetings every 3-6 months where the whole project team meets to discuss on the current developments and to plan the further steps in the project. The set up of regular online meetings and less onsite meetings improved the cooperation as long travels were avoided and regular exchange was increased. Specific thematical issues were discussed in bi- or trilateral meetings or within working groups (more details: see Mid Term Report).

Additionally, the CoB LandkreisL has subcontracted an external consultant (blue! advancing european projects) to support the work of the project management and of the PPs in different aspects (see Grant Agreement, Action E.1).

The project team summed up to complement each other well – the different strengths of the partners on forest measures, science and communication guaranteed a successful way regarding the project implementation.

Deviations from the work plan

As stated in the executive summary, the action B.3 on the valorisation systems could not be implemented as planned in the Grand agreement: The valorisation system on CO_2 was implemented in a simplified way, the one on water incentives on theoretical basis only.

Please find further information in Chapter 6.3 Main deviations, problems and corrective actions implemented – timely delays.

Communication with the Agency and Monitoring team

During the project lifetime, the project was in close contact with the ELMEN monitoring experts of the project, Theresia Holzamer, Lars Borrass and Jörg Böhringer. The contact took place via the CoB and the consultant.

From 2022-2024, 2 project visits took place providing the team with valuable feedback.

- Lars Borrass (ELMEN) on site and Joelle Noirfalisse (CINEA) online Oct 2022
- Jörg Böhringer (ELMEN) and Joelle Noirfalisse (CINEA) on site April 2024

Changes due to amendments to the Grand Agreement

In Sept 2023, the amendment no1 to the Grand Agreement was signed: The project was prolongated by 6 months leading to a final date at 30.6. 2024.

6. Technical part (maximum 25 pages)

6.1 Technical progress, per Action, together with 6.2

6.2 Evaluation of Project Implementation

Please describe **what and how** progress has been achieved regarding the different technical/substantial components of the project (such as research, fieldwork, construction, development of communication tools). Indicate what has been done regarding each action (sub-action if appropriate) but avoid describing the objectives and targets as such. The description of the work done has to be sufficient to allow a good understanding of the project without a need to refer to the deliverables. Present and discuss the main findings and results and their implications for other actions and the project as a whole. The technical details, however, should be given in the deliverables.

For each action (the description of which should start on a new page):

- Please indicate:

Foreseen start date: Actual start date:
Foreseen end date: Actual (or anticipated) end date:

- Describe the activities undertaken and outputs achieved in quantifiable terms (also indicate by whom they were done).
- Compare with planned output (including the foreseen action description, expected results, deliverables, and milestones) and time schedule. Please justify any deviations from the action start and end dates as well as the deliverables' and milestones' dates foreseen in the grant agreement and discuss the impact on other actions.
- If relevant, clearly indicate how actions were modified, and any correspondence with the Agency approving the changes (in particular this is required if there has been a significant over-spending of the foreseen budget for the action).
- Clearly indicate major problems / drawbacks encountered, delays, including consequences for other actions (technical, legal, financial/economic, market, organisational or environment related problems).
- Mention any complementary action outside LIFE.
- Outline the perspectives for continuing the action after the end of the project.
- Include tables, photographs etc. to illustrate the actions, such as (for LIFE Nature & Biodiversity, as well as LIFE Climate Action) land purchase and non-recurring management activities.

For LIFE Nature & Biodiversity projects, and LIFE Climate Action projects where applicable, the progress description should, in addition, include the following:

- Preparatory actions / management plan preparation
- Land purchase including Land swaps (NB if relevant there are compulsory annexes)
- Natura 2000 site designation (if relevant)
- Recurring biotope management

For the dissemination actions, please also address the following:

- Compare with the planned activity
- Was the objective reached? What reactions and feedback were obtained?

Compare the results achieved against the objectives and expected results foreseen in the proposal and described in section 4: clearly assess whether the objectives were met and describe the successes and lessons learned. This could be presented in a table, which compares through quantitative and qualitative information the actions implemented in the frame of the project with the objectives and expected results in the revised proposal:

Remark:
Chapter 6.1 and 6.2 were answered together within the following actions. As requested by the monitoring support during the elaboration of the Mid-Term-Report, the chapter exceeds the recommended length to ensure greater insight into the different actions and work performed.

Action A1: Scoping exercise on knowledge base and set up of continuous working structure

Partner: LandkreisL

Foreseen start date: Sept 2020	Actual start date: Oct 2020
Foreseen end date: March 2021	Actual (or anticipated) end date: July 2021*****

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

Activity A.1 was finalized before the Mid-Term Report, leaving open for improvement the deliverable on the database of existing knowledge and catalogisation of the sources.
As requested in the CINEA-Letter from 20.01.2022, ***Technical issues, Issue 2a,*** the Excel-based Knowledge base was transformed into a free and open access form via the literature referencing and management software Zotero. The Literature used in the project can now be found by external users. Within the browser-version of the software a forum delivers a place for further discussions on the literature and data.
The link to the FutureForest Zotero online group is https://www.zotero.org/groups/4904150/eu_life_futureforest and the instruction on How to use it can be found in an additional submitted document ("Action A.1_knowledgebase_zotero_how_to")

Action was fulfilled in cowork of LandkreisL and HSWT with support of StadtL.

Changes of action/budget (if relevant):
None

Major problems/ delays of the action (+justification and impact on other actions):
*****For two reasons, the "Data Base of Existing Knowledge" (Del) was not finalized in 2021: Firstly, it is understood as "living table" which is further extended during project lifetime (mainly in 2020-2023), and secondly, improvement was requested from CINEA.

Mention any complementary action outside LIFE (if applicable):
None

Perspective for continuing the action after the end of the project:
The Zotero data bank will stay online for interested persons, students, and projects.

Illustration of the action:
None

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

Keeping the excel-based knowledge base accessible for external users the decision was made to use the free and open-source literature reference management software "Zotero". The project has got an own account page within the online community of the software. Throughout the account page the literature can be searched, updates can be seen and also a forum is available in which discussions can take place.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved since 2022	Evaluation
A1: Scoping exercise on knowledge base and set up of continuous working structure	Objectives: • Knowledge base for information exchange • Involvement of stakeholders Expected results: • Database of existing knowledge • Informal cooperation concept on inter-municipal level • Round table meetings	• Knowledge base for information exchange	• An open access version of the knowledge base will keep the collection alive throughout the end of the project

Action A2: Update of a work plan and development of a baseline scenario 2050

Partner: LandkreisL

Foreseen start date: Sept 2020	Actual start date: Oct 2020
Foreseen end date: June 2021	Actual (or anticipated) end date: Nov 2021

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

Preparatory steps

As part of this action, the work plan was updated for the first 6 months as detailed roadmap for the achievements of the targets (Del). Also, in the beginning of the project, a consultant (blue! advancing european projects) was contracted to support the CoB and project consortium in the coordination of the project.

Baseline Scenario

The basis scenario (Del) represents an all-round approach to the LIFE Future Forest project. The following is presented: Why a basic scenario is created, the status of the forests (Bavaria, Landsberg am Lech district, in the project communities), factors in the Landsberg am Lech district that influence the project, the status quo of the monitoring processes and further planning, planned maintenance measures on the reference areas, monitoring in the project, public relations, the key project indicator table, the approach for CO2 storage and valorisation systems.

Subaction: further specification of relevant baseline scenario in a place-based approach

The subaction on further specification of "Carbon Storage" and "Valorisation of existing ecosystem services" deals with the methodology development of carbon storage within the project areas (Del). First step is the desk research of existing place-based data. Research results of past projects are collected, analysed, and integrated into the existing knowledge database. Based on climate change studies for global basis and the basis of the county Landsberg am Lech the influence of climate change for the region are displayed. Furthermore, the methods for calculation and monitoring of carbon storage are introduced.

First steps in the field of valorisation of existing ecosystems are initiated. The result of a round table for discussing the aims of a valorisation system for the research area was that the priorization of just one ecosystem service (e.g.: carbon storage) at once will neglect too much potential of a functioning ecosystem. Therefore, a future valorisation system should combine more than just one service for a designated area (find further information with Action B.3).

This baseline scenario with its further specification of "Carbon Storage" and the "Valorisation of existing ecosystem services" provide data necessary for the self-assessment of the project site (Action B.1) and for the monitoring of project relevant indicators (Action C.1).

Action was fulfilled in cowork of LandkreisL and HSWT with support of StadtL.

Changes of action/budget (if relevant):

None

Major problems/ delays of the action (+justification and impact on other actions):

Due to the delayed employment of the designated employees (Nikolaus Storz - LandkreisL and Christian Diehl HSWT) for this Action only in March 2021, the entire completion of the Action was only finished in November 2021. This delay led to a current, timely delay in Action B.1 (one year in comparison to the planned starting date) and B.3 (2-3months), as no personnel capacities were open, and results of Action A.2 are needed for these actions.

Mention any complementary action outside LIFE (if applicable):

None

Perspective for continuing the action after the end of the project:

None

Illustration of the action:

None

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

Basis scenario:

- Success: Creation of a large overview of the project and its goals, including a collection of data relevant for self-assessment and monitoring.
- Failures: Much data had to be requested from external institutions or was not available.

Carbon storage:

- Success: During the numerous „soil and forest event weeks“ with students from HSWT, the methods for analysing the carbon storage potential of different tree species are generated and defined as easy to reapply methods in different sectors of the research areas (also for non-professionals).
- Failures: In scientific literature, sources of research in fine roots of trees are barely to find. This will make it difficult to compare the accuracy of our analysed data.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
A2: Update of a work plan and development of a baseline scenario 2050	Objectives: • Development of a baseline scenario 2050 for the reference areas • Integrated Scan of the baseline status and necessary steps to start work Expected results: • Baseline Scenario 2050 report • Updated work plan • Methodological elaboration for carbon storage and valorisation • Acquisition of a consultant for the assistance in the coordination of the project	• Baseline scenario 2050 • Updated work plan • Collection of methods for calculating above-/underground carbon storage per tree species • Initial discussions about future valorisation systems led to first structures (for Action B.3) • Acquisition of consultant for project assistance	• Timeline of workplan adaption necessary • Methods for analysing CO_2 storage potential easy to reapply. • Difficult to verify accuracy of generated data • Valorisation not only for single ESS.

Action B1: Creation of an instrument for regional self-assessment including a replicable legal framework

Partner: HSWT

Foreseen start date: Jan 2021	Actual start date: Dec 2021
Foreseen end date: June 2022	Actual end date: Jun 2024

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

Set-up of a self-assessment tool for municipalities

For the set-up of the self-assessment tool, as a first step a legal framework package was compiled. It summarizes the most important points of the diverse legislation covering the topic of "forests" in Germany and Bavaria. This document is intended to provide an overview of the current legal situation in Bavaria and Germany, which influences the management, availability and sustainability of Bavarian and German forests, as well as important forestry terms including their applicability with regard to Future Forest forests. These range from the Nature Conservation Act to the Hunting Act and the Forest Reproductive Material Act.
In addition, important forest terms were defined that are important for the availability and expansion of communal and private areas for sustainable forest and land management. These include, for example, "exemplary management", fences, clear-cutting, hunting damage or afforestation authorization.

Then, in 2022, after the initial searches for existing evaluation methods, no comparable or applicable method could be found. The usual practice used were standardized credit ratings per tree species for height, thickness and increment. The rating ranges from one to four, with one being the best rating. No evaluation of soil is made, for example. A forester can go into his forest with these values and compare his own values (height, thickness) for each tree species with those in the table and determine a rating. The project team has chosen a completely different and new type of evaluation with its evaluation scheme to enable forest stands to be categorized in a simple and comprehensible way (modular approach, see illustration of action).
The aim of the assessment sheet is also that it can be used independently by forest owners or municipalities and, as a result, determines the level of the forest in terms of its conversion progress, climate change adaptation and ecosystem services. The overall level shows the calculated value of the existing ecosystem services, which are paid out to the forest owner through the compensation model (B.3), and, thus, the value of the potential ecosystem services (level 4).
The tool was tested and refined by the project team on trial areas before being applied on a large scale in the communal forest of Fuchstal during a soil and forest event week (D.2) in fall 2022.
It must be pointed out that no specific planting recommendations and therefore cost estimates can be given, but only general recommendations. There are several reasons for this. Firstly, in Germany there is government advice from forestry officials and funding for forest owners. Furthermore, due to the very diverse biological and geological conditions, a general

recommendation is not possible here but must always be considered and evaluated on a case-by-case basis.

At this point, plans were already underway to develop a digital version of the assessment form (app), which should make it much easier and faster to find areas and calculate the areas and levels. A proposal for a compensation model specifically designed for forests in drinking water protection areas was also drafted.

Self-assessment of project site: Pilot Project Fuchstal and Schwabhausen
As preparatory planning for the planned pilot project to implement the compensation model (B.3), discussions were held with potential donors (e.g. large regional companies such as Hirschvogel and Hilti) to secure funding for the pilot project.
The pilot project began in autumn 2022 with a round table meeting in the municipality of Fuchstal (having the highest % of spruce in their tree distribution (79,8 %, see A.2 basis scenario)). The concept was presented to interested forest owners and citizens and a registration period was defined. Forest owners with a total area of around 120 hectares were recruited for the pilot project. As the funds promised by the companies were lost at short notice, the municipality of Fuchstal agreed to finance the pilot project (more info, see B.3). As part of a bachelor's thesis, which was supervised by the research assistant of the LIFE project at the HSWT, the entire area was evaluated using the self-assessment tool. Finally, in the fall of 2023, another round table meeting was held in Fuchstal, where the results were presented, and certificates were awarded to the forest owners.

During the soil and forest event week (D.2) with students in March 2024, the self-assessment tool on the water compensation, which is different to the one of the ecosystem services – it is very simple, using only the % of coniferous and deciduous trees as evaluation basis plus the exclusion of nitrogen fixing tree species such as *Robinia pseudoacacia* and *Alnus ssp.* - , and the app were tested in the Schwabhausen drinking water protection area and valuable tips on further development or time efficiency (especially with regard to the app) were gained.

The work on the self-assessment tool is documented and integrated into the Future Forest handbook (see E.2).

Action is fulfilled in co-work of HSWT and StadtL with support of LandkreisL.

Changes of action/budget (if relevant):
In the project, a program was written for the "Mergin Maps" app to considerably simplify and digitalise the use of the assessment form and the evaluation process. This means that an evaluation of the forest is GPS-based and can be used offline. During a soil and forest event week (D.2) in Schwabhausen, the use of the app was tested and compared with the traditional method.
The results of the test were consistently positive: after a short introductory period of five minutes, all test persons were able to use the app and carry out the assessment of the stands independently. To ensure long term use, a guidance was developed, and a web seminar took place and was recorded. Both is available online: https://www.klimaschutz-landkreis-landsberg.de/fileadmin/upload/klimaschutz/dokumente/Handbuch_APP_Future_Forest.pdf

; https://www.klimaschutz-landkreis-landsberg.de/eu-life-future-forest/handbuch-fuer-nachhaltigen-waldumbau/
There were no technical problems, which meant that the entire project area of around 60 hectares could be classified in just a few hours. With the help of the app, the time required for the survey was roughly halved compared to the traditional method with printed maps and evaluation forms.

Major problems/ delays of the action (+justification and impact on other actions):
The needed parts of B.1 were implemented with one year delay due to the delay from the project start (see Midterm report). The finalization for B.1 can, though, only be named for June 2024, as the testing of the simple water self-assessment took place in March 2024 and the finalization of the guidance for the app in June 2024. As the other Actions were worked on in parallel, no further impact can be named.

Mention any complementary action outside LIFE (if applicable):
In order to simplify and accelerate the implementation of the self-assessment tool, the app "Mergin-Maps" was supplemented with so called "layers" by an external service provider that supports and implements the tool digitally and based on GPS. Together with the new layers, forests can be evaluated with the app according to the Future Forest system. The app was then used for the first time in the Schwabhausen drinking water protection area during the soil and forest event week in March 2024 and tested by students. The supporting files required for the Mergin Maps application be downloaded from the project website (links see above). Mergin Maps works with both Android and Apple. Additional videos explaining the process are available on the same website.

Perspective for continuing the action after the end of the project:
The pilot project in Fuchstal will run for the next 5 years. In the municipality of Scheuring, there is already a local council resolution that the remuneration system developed in the project should be offered to private forest owners in order to implement forest conversion as quickly as possible and maximise the ecosystem services of the forest. The evaluation of the forest areas and the analysis of the data using the self-assessment tool is being realised by a final thesis by a forestry student at the HSWT.

Illustration of the action:

Baumarten	> 80 % Nadelholz (außer Tanne)	> 20 % Laubholz-und Tannenanteil	> 50 % Laubholz + Tannenanteil (davon > 50 % regenwurmfördern-de Arten)	> 80 % Laubholz + Tannenanteil (da-von > 50 % regenwurmfördern-de Arten)
Gewichtung 4-fach	1	2	3	4
Humusform	Rohhumusartiger Moder	Moder	Mullartiger Moder	Mullhumus
Gewichtung 3-fach	1	2	3	4
Vertikale Struktur/ Bewirtschaf tungsart	Monokultur/ Alters-klassenwald	Altersklassenwald im Umbau	Strukturierter Mischwald mit mindestens einer dienenden Baumart	Dauermischwald/ plenterwaldartige Strukturen
Gewichtung 2-fach	1	2	3	4
Naturver jüngung/ Verbiss	Keine oder nur Nadelholzverjün-gung	Vorbau/ Verjün-gung gesichert (über 2m), keine Verbissgefahr mehr	Vorbau/ Verjüngung über 5 m, flächig vorhanden	fertig umgebaut, Naturverjüngung flächig vorhanden
Gewichtung 1-fach	1	2	3	4
	Gesamtbewertung des Bestandes			
	Stufe 1	Stufe 2	Stufe 3	Stufe 4

Figure 1: Scheme of the Self-Assessment Tool

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

The pilot project was very well received with a total of 30 participants and an area of around 120 hectares. During the evaluation of the areas by the student, the difficulty of finding areas accurately using a map became clear. By developing the app, both the accuracy (thanks to the offline GPS function) and the efficiency of the processing (automation of the step calculation) were significantly increased. Overall, the duration of the process could be halved and thus also the future costs incurred for a service provider.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
B1: Creation of an instrument for regional self-	Objectives: • legal framework package • evaluation of existing evaluation methods for	• Legal Framework package • Search for of existing evaluation	A pilot project could only be initiated in Fuchstal.

assessment including a replicable legal framework	counties and communities in Germany • creation of a replicable self-assessment for regional and local use by municipalities Expected results: • Self-assessment tool for municipalities • Legal framework assessment methodology • Part 2 of handbook • Finalised assessment	methods for counties and municipalities in Bavaria • creation and implementation of a self-assessment for regional and local use by municipalities • creation of a digital version of the self-assessment (using as an App) • Handbook, Part 2	A remuneration system is to follow in the municipality of Scheuring, which is being developed in cooperation with HSWT. The results of the soil and forest event week in March 2024 gave impetus to a forest water premium

Action B2: Demonstration of afforestation and maintenance measures for sustainable forests and soils

Partner: City Landsberg am Lech

Foreseen start date: Sept 2020	Actual start date: Oct 2020
Foreseen end date: Dec 2023	Actual (or anticipated) end date: Jun 2024

REMARK:

As requested by CINEA during the visit in April 2024, a short definition on forest management is added here:

The classic predominant management form of forest stands in Germany is the age-class forest. Here, comparable stands of the same age, which are spatially separated from one another, are managed in batches in a cycle of planting, care, harvesting (clear-cutting) and replanting or natural regeneration. In the age group forest, only a few tree species are used. The large amount of wood produced at the same time when harvesting after a certain rotation period facilitates both data collection and logistics and therefore makes this form of management popular with forest owners.

Sustainable forest areas include those that are already maintained according to the Future Forest permanent forest concept. The permanent mixed forest (with structures like the Plenterwald) refers to a form of high forest based on the principle of the continuity of the forest as a living organism. This includes some basic elements such as clear-cutting-free forest management through the use of individual trees (trees of the future) and the associated good and regular income from the use of valuable wood, non-uniformity (functioning natural regeneration), tree stocks in all age structures, sufficient harvestable stocks of valuable wood at any time, mixed stocking and high biodiversity as well as little damage to the system through moderate , but regular use and avoiding the use of large machines. In addition, during management and maintenance, particular attention is paid to promoting or introducing new tree species that promote soil life (e.g. earthworms) and thus maximize the soil performance of the forests. This silvicultural and sustainable permanent forest management goes well beyond the legal requirements for sustainable forest management.

Specific data and evidence can be found in the documentation for Action B.2.

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

Detailed planning and preparation

For the LIFE Future project, numerous areas (both privately owned land and public forest) are available in the Landsberg district for monitoring (Action C.1), various maintenance measures and reforestation (details please see Del: Action B.2_Del.Roadmap_for_ActionB.2). The roadmap (Del) using as basis the info gained from A.2, puts the focus on the gravel soils, clay soil, fluvisoil and the drinking water protection area in Landsberg and Schwabhausen. The measurements are differentiated according to three different soil types: gravel, loam and fluvisoils. The main tree species of the study are coniferous woods (spruce - fir) and hardwoods (hardwood - oak / beech - other hardwoods (precious hardwood)). The planning of the planting in the forests of the municipalities is the responsibility of the foresters from the Office for Food Agriculture and Forestry, who are not project staff. As a result, the

project's influence on the detailed planting measures is manageable. The planting in the forests of the private project partners, on the other hand, is planned by the project team. A detailed photo documentation of the measuring equipment and research was produced (see Deliverable “Action B.2_Del_Detailed plan and photo documentation of afforestation and maintenance measures”).

Natura2000 areas and Future Forest

Within the Future Forest project, also plantings took place in a Natura 2000 site. In the Natura2000 area in Scheuring, supplementary planting was implemented on a large scale in 2023. 525 trees were planted across the entire plot. The special feature is that only tree species were planted that were not yet present and expand the range of species and habitats. Tree species planted include wild cherry, hornbeam, black poplar, crab apple, wild pear and chestnut.

It needs to be mentioned, that in difference to the other areas particular attention was paid to the use of native tree species as well as excessive interventions to promote the permanent forest and habitat structures of the existing Natura 2000 species. The specific objectives of the Birds and Habitats Directive had no further influence on the measures taken in those areas.

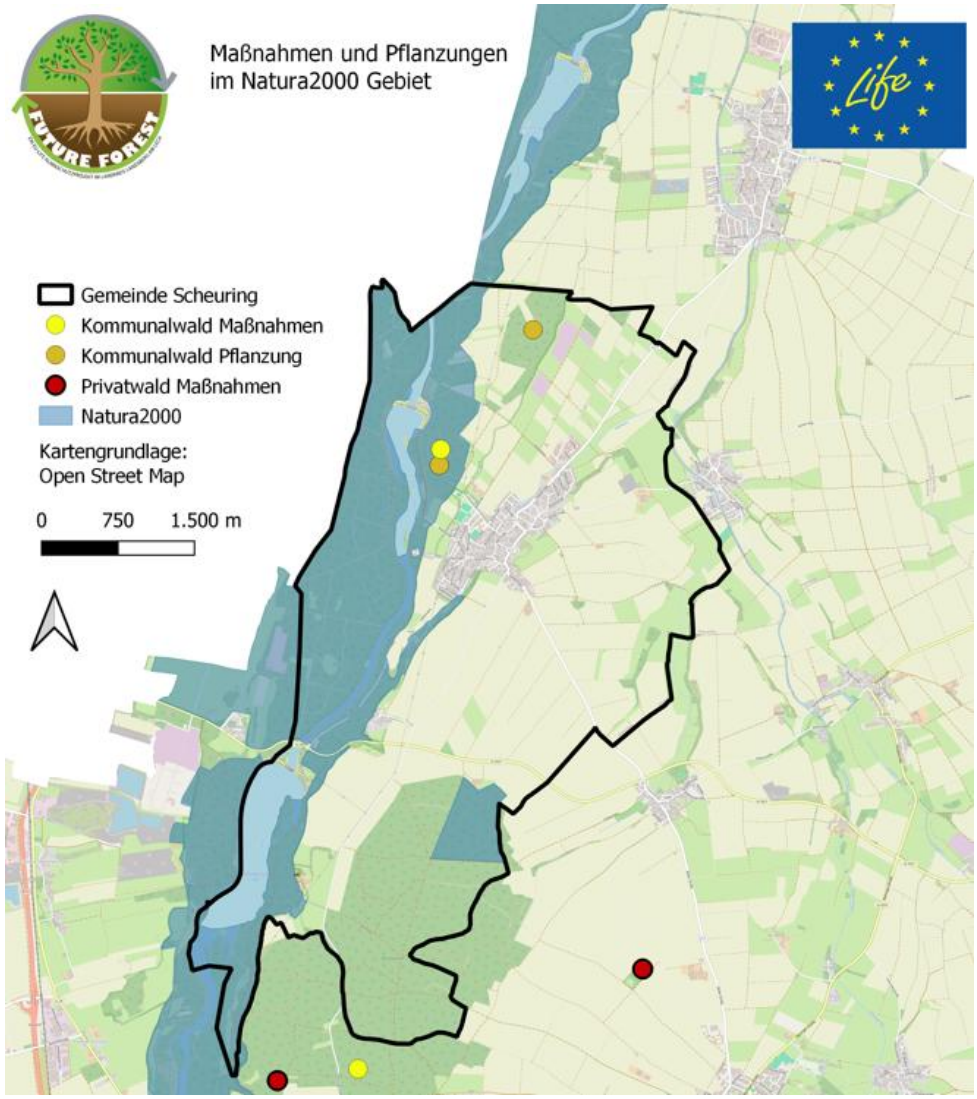


Figure 2: Map of the Natura200 sites of LIFE Future Forest within the municipality of Scheuring

Demonstration of afforestation for forest conversion

During the project time, a total of around 66.904 trees could be planted in the project. Those trees were planted on more than 325 ha of land ("Please find detailed information in Deliverable "Documentation of first activities of afforestation and maintenance"). The focus of the plantings was on the introduction of earthworm-friendly species such as linden, hornbeam, and sycamore maple. There are also numerous rare tree species that were planted to enrich the diversity of species in the forests and to spread risk (diversity). A detailed photo documentation of the plantings was prepared. In contrast to the original plan in the GA, fewer beech and oak trees were planted. This is partly due to the fact that these tree species are already present in large quantities in the natural regeneration process and do not need to be planted. However, the main reason for the lesser consideration is the results we obtained at the start of the project. During our studies we found that both species are not very earthworm-friendly, and that beech in particular is not very heat-tolerant in relation to climate change. For this reason, we replaced the two tree species with more suitable ones. These were, for example: linden trees, service tree, sweet chestnut, Norway maple and others. If these species were included as replacements for beech and oak in the tree species distribution shown in the GA, the distribution would be 71% to 29% other species. This distribution would therefore almost correspond to the originally planned distribution.

The detailed documentation lists the exact distribution of the plantations according to the different tree species, which is again divided into municipalities, private forest owners and individual parcels of land (Del).

The plantings were documented by the city of Landsberg.

Demonstration of maintenance measure for sustainable forest (and soil) management

For the demonstration of maintenance measures for sustainable forest (and soil) management, the Grant Agreement (GA) sets a target of achieving sustainably maintained forests on 450 hectares. However, upon closer examination, it becomes evident that the exact definition of these 450 hectares is not fully consistent within the GA, as the target is described in two different ways:

1. Increase of the area with continuous sustainable forest management through appropriate maintenance measures in the county by 450 ha (GA, p17, Expected results).
2. On 450 ha, the entire forest will be continuously maintained in a rather sustainable condition that is anchored in the history of the area (GA, p49, Action B.2).

Despite these inconsistencies in the target definitions, the project effectively achieved its objectives in a tangible and meaningful way:

During the project lifetime, sustainable forest management principles were implemented across 403 hectares, ensuring continuous maintenance and improvement of the forest. This was accomplished through a combination of sustainable wood management, selective tree removal, and, where necessary, additional planting of trees and tree species. The approach was guided by the principles of natural, climate-stable permanent forests, aligning with the project's overarching goals. The entire 403-hectare area was systematically assessed and transformed according to these principles, serving as a model for sustainable forest management. Further details can be found in the deliverable "Action B.2_Del_Detailed Plant and Photo Documentary."

Although the project fell slightly short of the 450-hectare target, it is important to emphasize that nearly 90% of the intended area was successfully managed under a sustainable framework.

The 403-hectare area consists, on the one hand, of previously piloted areas where forester Pertly had initiated sustainable practices over the last 40 years, though only on a limited scale and without a structured, area-wide implementation (see GA, p49: “forest will be continuously maintained in a rather sustainable status that is anchored in the history of the area”). While some sustainable practices existed before, they were fragmented and experimental. Within the project lifetime, these areas were systematically assessed, improved via specific maintenance measures and additional plantings, and expanded, ensuring their full integration into a formalized, structured, and scalable sustainable forest management framework under the LIFE Future Forest principles.
On the other hand, the area also includes newly reforested sections (e.g., former old-growth spruce stands) where both maintenance and planting activities took place, further contributing to the expansion of sustainable forest management in the region.
Therefore, the sustainable forest management approach, as described in p24 of the Final Report, was applied to existing piloted areas and new areas, thus expanded in scope, formalized in methodology, and strengthened in implementation across 403 hectares, ensuring a significant increase in the area under continuous sustainable management. Through this, the project effectively contributed to the overall goal of increasing sustainable forest management in the county, as targeted in the Grant Agreement.

Ultimately, while the numerical target of 450 hectares was not entirely reached, the project met its substantive objectives by securing the long-term sustainable maintenance and enhancement of a significant reforested area. More importantly, the project’s impact extends beyond the specific hectare count, as the work done serves as a replicable model for sustainable forestry and provides a foundation for continued improvement and expansion in the future.

<u>Positive hunting management</u>
The positive hunting management without protective measures, particularly in the areas of the city of Landsberg and the municipality of Scheuring, was crucial to achieving these sustainability goals. Hunting on the areas was carried out by specialist personnel and not by private hobby hunters. All types of hunting permitted in Germany for hoofed game were consistently implemented, which ultimately led to the above-mentioned success.

A stable, healthy mixed forest has turned from a matter of attitude into a question of survival, at the latest as climate change progresses. Only a species-rich, natural forest has the strength to withstand the increasing stress that is increasingly putting strain on the ecosystem and to offer local wildlife a healthy habitat. The goals for forest conversion are clearly defined, action is absolutely necessary. But can silviculture strategies that rely on tree species diversity, structural richness and natural regeneration survive if hunting remains the same as a key component?

An outstanding task of hunting is to achieve a density of hoofed game that is compatible with the habitat. Hunting must ensure the development of all species typical of the habitat (e.g.

trees, bushes and herbs and all animals associated with them). In doing so, it creates the conditions for landowners to have all options for using their land within the framework of the legal requirements and to be able to use it according to their individual goals. A constructive dialogue between hunting companions and those authorized to hunt is necessary in order to promptly take into account the interests of those who own the property in hunting management. Important elements of this dialogue are joint visits to the territory and vegetation monitoring procedures such as wisecracks, browsing recordings and peeling damage reports. Monitoring game densities includes, for example, venison weights, condition and health status of game stocks, which are reported to the forest owners' association (WBV) and positively control hunting management.

Means for this can e.g. B. the more flexible design of hunting leases. Minimum lease periods are a hindrance and should be abolished if possible. In addition, self-management should be encouraged and leasing to clubs should be made possible. The detection of damage caused by wild animals in the forest must be made more practical and the damage must be fully compensated. The focus with regard to hunting during the project period is to educate the general public about the importance of this objective as well as to educate all responsible groups of people (hunters, hunting associations, mayors, etc.) about the importance of modern hunting.

The states' vegetation reports on forest regeneration show one thing clearly: despite great progress in individual cases, the overall results are not sufficient for the necessary adaptation.

For information on the socio-economic cycle and the trading schemes, please see Action B.3 & C.1.

Activities related to the development of more insights

The measuring devices, e.g. dendrometers, were installed on different trees under similar conditions and on same trees under different conditions (e.g. different soil types) to increase the number of insights. Installed at the start of the project, they are currently in use and are maintained and regularly evaluated by the project team. Due to the long-term design of the measuring devices, their use is also planned for the coming years (see After LIFE Plan). More info, see C.1.

Regular joint reflection and progress discussion in round table

Four further round tables have been held since the mid-term report. At these, for example, the start of the pilot project in Fuchstal was discussed, the results of the soil and forest event week were presented and discussed in a two-day event, and the results of the self-assessment tool were also discussed using the app for the forest water premium. These events were attended by private forest owners, representatives of interest groups (IG Gesunder Boden, Nantesbuch, Aufbauende Landwirtschaft) as well as foresters and representatives of local politics.

Documentation in the appropriate handbook chapter

The findings are explained and presented in detail in the handbook, as they form an important basis for the objectives and arguments of the project. They are therefore an important component and basis of the handbook (demonstration character). Nevertheless, the contributions from other activities of the project (round tables, documentation of forest activities, cooperation between the StadtL and other municipalities etc) already builds up valuable content for the handbook.

Technical issues raised in CINEA letter 11/2022:

Issue 3b: As the documentation of B.2 was not sufficient, we discussed the documentation with Mr Borrass after the CINEA letter of 11/2022 and optimised it with his advice. Furthermore, we included important points from the discussions within the CINEA visit in 04/2024.

Issue 3b-i: The information on the areas and location of the afforestation sites, description of the forest stands, figures and specification of species/age of the planted trees was further improved and can be found in the deliverable "Action B.2_Del_Detailed plan and foto documentary". It also includes maps and photos of the implementation sites.

Regarding the specification (including a description of the criteria of the "future forest concept") and aims of the maintenance and harvesting measures as well as the "positive hunting management without protective measures", the following can be stated:

This type of permanent mixed forest refers to a form of high forest based on the principle of permanently covering an area. This includes some basic elements and the following detailed objectives for silviculture and hunting management.

First of all, there is a need for clear-cutting forest management through the use of individual trees (Z-tree concept). A diversity of ages and a stock of trees in all age structures as well as a high level of mixed vegetation and species diversity must be promoted. For this purpose, thinning interventions are necessary at least every 5 years in order to control the lighting conditions accordingly. The proportion of coniferous wood should first be reduced and tree species that are not climate-friendly should be removed. This should be done moderately but regularly. If there are no mixed tree species in the natural regeneration, missing mixed tree species can be introduced into the resulting gaps. In particular, earthworm-friendly and drought-resistant species.

In order to make this concept possible in the long term, natural regeneration of the trees is essential, and this is only possible through adapted populations of hoofed game and adapted hunting management.

When it comes to hunting management, Future Forest has the following objective: to achieve a density of hoofed game that is compatible with the habitat. This means that the development of all typical species must be ensured. To achieve this, all available hunting methods provided for by law must be used permanently and intensively, in particular driven hunting.

In addition, Future Forest makes further demands on the legislature regarding hunting in order to improve and expand these opportunities in a contemporary manner.

Issue 3b-ii: The added value of the activities implemented within the LIFE project compared to how the forest stands would be treated without your LIFE project (innovation character) will be described in the following:

Thanks to the Life Project, the studies were able to demonstrate the importance of certain tree species and their proportions in the permanent forest as well as the positive effects of an appropriate permanent forest concept. The project has therefore significantly led to a new composition of tree species for the planned future forests. (Planting of earthworm-friendly tree species, even if not always interesting from a forestry perspective) The tree species requires different thinning measures and control of lighting conditions in the stands which would not have been carried out without the project.
When it comes to their role for the development of the project's handbook (demonstration character), please see above.

Issue 3b-iii: Regarding the conditions of the cooperation with the forest owners, after the CINEA visit in 04/2024 the existing cooperation agreements were improved, see supporting documentation "Action_B.2_3_Participation_FutureForestFunds_ForestOwners" It can also be found online: https://www.klimaschutz-landkreis-landsberg.de/eu-life-future-forest/zukunftswaldpraemie-fuchstal/

Issue 3b_iv: The detailed roadmap on B.2 (Deliverable) was updated regarding the role the demonstration sites after the end of the project and how their further development will be monitored in the long run. The information was also included in the AfterLIFE Plan.

Action is done by City of Landsberg, all activities in the forest were documented.

Changes of action/budget (if relevant):
For B.2, 388.000 EUR on EE were foreseen. Most of the planning work was carried out by forestry project staff. This was also due to the legal situation in Germany, which requires the management of public areas by forestry staff and prohibits outsourcing to companies.

Major problems/ delays of the action (+justification and impact on other actions):
The project team was only responsible for planning the planting on the areas of the private project partners. The areas of the municipalities were all planned and implemented by the responsible district forester. As a result, the influence on the planted tree species was quite small, as the ideas of the goals of the Future Forest concept and the goal of the forester were somewhat different. The majority of forest owners still rely on proven tree species that generate maximum profits as timber. A change in thinking is only taking place slowly and still requires a lot of advice and lobbying. However, thanks to the enormous public relations work carried out by the FF project, very good impulses were made which set a discussion and thought process in motion. The reporting of the planting figures to the project by the forester was also sometimes very complicated and it often took a long time and many enquiries before the figures were provided.

Mention any complementary action outside LIFE (if applicable):
By cultivating and building up contacts in a variety of ways, a number of supra-regional interested parties have been found who want to convert their forests in line with the Future Forest concept. Trees have already been planted in some areas (The Art & Nature foundation Nantesbuch, Finksche Forstverwaltung, Lammsbräu, Schloss Tempelhof) to promote living soil, while plans for planting are underway in others.

Perspective for continuing the action after the end of the project:
Numerous measuring devices were purchased, installed and analysed as part of the project. These devices will continue to be supervised by students at Weihenstephan-Triesdorf University of Applied Sciences (HSWT) and are designed for a long service life, with a minimum support period of ten years. Practical examples on site, such as the Hartmahd forest walk with the town council and the pilot project in Fuchstal, will remain in place and continue to be utilised.
The concept of FF is to be further disseminated through the Future Forest handbook.
A central aim of the project is to achieve high biodiversity, resilience and low risk, as well as to promote high ecosystem services (ESS) and a living soil. The need for forest conversion and the target tree species are also disseminated via this manual.
Examples of the implementation of this concept are also currently being created outside the project area, including in Neunburg vorm Wald, Scheuring, Lammsbräu and Schwangau.

Illustration of the action:

Figure 4: planting lime trees

Figure 3: planting fir with protection

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:
The technical devices used (dendrometers, soil moisture sensors, temperature sensors) have proven to be excellent measuring instruments. They are designed to be extremely durable (battery life and resilient) and are therefore suitable for long-term use even beyond the end of the project. The price of the measuring devices is absolutely justified and was a good investment in the long-term monitoring of the forests. Initial analyses have also shown how valuable the results are and that very good differences between the individual tree species

and locations can be depicted and measured. A master's thesis will be completed in autumn 2024, which analyses the data in its entirety.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
B2: Demonstration of afforestation and maintenance measures for sustainable forests and soils	Objectives: • Detailed planning and preparation • Demonstration of afforestation for forest conversion • Demonstration of maintenance measures for sustainable forest (and soil) management Expected results: • Part 3 of the handbook • Detailed plan and photo documentary of afforestation and maintenance measures • Detailed roadmap for Action B2 • Diary of round table discussion content	• In total 403 ha were planned for afforestation and maintenance • Handbook Part 3 • Afforestation and maintenance were demonstrated, in total on 403 ha. All measure devices are installed for monitoring, incl. documentation of the various research measures • Planting of 66.904 trees • Diary or round table content	The backlog in planting at the start of the project has been completely made up. As expected, the measuring devices are of high quality and can continue to be operated in the long term. Utilisation and maintenance of the measuring devices is ensured in the long term.

Action B3: Valorisation system for municipal ecosystem services and modelling of the integration of the results into political decision-making

Partner: City Landsberg am Lech

Foreseen start date: Oct 2021	Actual start date: Oct 2021
Foreseen end date: Dec 2023	Actual (or anticipated) end date: June 2024

Technical progress (Technical issues raised in CINEA letter 11/2022, Issue 4)

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

In Action A2 first concepts of valorisation systems were set up. The original plan was to offer two separated systems. One for the sequestration of CO_2, the other one for enhanced quality and quantity of drinking water. Ecosystems and especially the ecosystems of forests are highly complex structures. The quantification and differentiation of single components of such systems is not completely possible.

Future Forest Fonds

(see also pptx wit supportive document ("Action_B.3_FutureForestFonds_pptx"))

Fehler! Verweisquelle konnte nicht gefunden werden. shows the idea of a valorisation s ystem for forest owners who follow the Future Forest agenda of forest conversion. The agenda contains the conversion of needle wood-forests in higher percentage of beneficial deciduous trees. Through the usage of beneficial deciduous trees, an increase in humus and soil vitalization as well as soil improvement can be expected. The high amount of leave litter will improve the abundance of earthworms and ensure a functioning nutrient cycle. Additionally, the higher percentage of deciduous trees are capable of reducing the amplitude level of temperature in hot periods through a higher amount of evaporating water in their leaves.

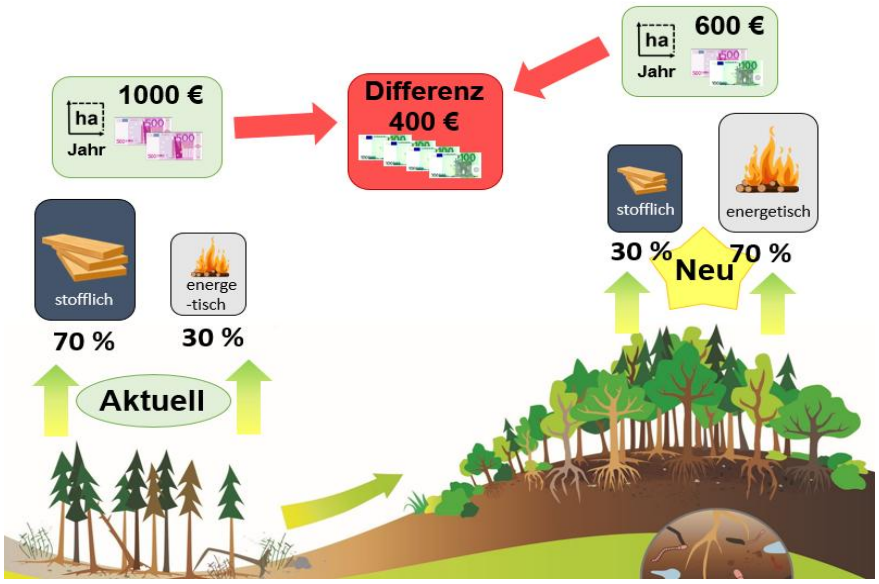


Figure 5: Calculation of the area turnover per year in a spruce monoculture compared to a permanent forest

Problem Definition: High amounts of carbon dioxide storage in forests only work if the forest areas are left untouched. The forest areas of the EU LIFE Future Forest project are highly

structured permanent deciduous forests. To maintain the structure of these forests, frequent thinning is essential. Thinning, however, also involves the removal of biomass/wood, and thus the removal of carbon from the stock. The removed wood is usually processed into energy wood/chips and used for energy purposes. Long-term carbon storage is therefore not achieved and contradicts the idea of carbon storage for certificate creation.

The Future Forest project was launched to emphasize the climate resilience of permanent deciduous forests. Resilience in forest ecosystems is found in highly structured permanent forests. After severe calamities or extreme weather events, these ecosystems remain essentially intact. In contrast, the prevailing age-class forest management form in Germany typically leads to widespread destruction, resulting in clear-cut areas and loss of ecosystems following intense biotic and abiotic disturbances.

A forest ecosystem provides many ecosystem services. Examples include biomass production, cooling of the environment, provision of groundwater and drinking water, air purification, oxygen generation, flood and erosion control. However, there are many other services not mentioned here that are equally valuable but are not the focus of this project. To ensure that the sale of certificates does not reduce the ecosystem service of the forest to merely carbon storage, a certificate has been developed that aims to honor the overall value of permanent deciduous forests. This is even more tangible and shows more direct added value to the local citizens making it easier understandable why payments for forest owners are so essential and leading to a shift in the value of ESS of forests and soils provide to citizens which are not granted if the owners do not take necessary steps.

Another hurdle for the creation of compensation certificates in German forests is described below. The issuance of CO_2 compensation certificates in German forest areas is not permitted due to the regulations of the Kyoto Protocol. Here are the main reasons for this:

1. **Avoiding double counting**: The Kyoto Protocol mandates that CO_2 sinks, such as forests, are recorded in the national greenhouse gas inventories of the signatory states. When a country calculates and reports its CO_2 emissions, it also includes the CO_2 uptake by forests. If CO_2 compensation certificates were additionally issued for these forests, the same CO_2 reductions could be counted twice: once in the national inventory and once as certificates. This would distort the actual CO_2 reductions.
2. **Additionality criterion:** A central criterion for CO_2 compensation projects is "additionality." This means that CO_2 reductions or uptake must occur in addition to what would be expected anyway. In many cases, existing forests in Germany do not meet this criterion because they are already legally protected and serve as CO_2 sinks. Projects that already exist or are financed for other reasons are not considered "additional" and thus cannot receive certificates.
3. **Avoiding "leakage":** Leakage refers to the effect that protection measures in one area merely shift emissions to another area. For example, if the use of forest areas in Germany is restricted, the demand for timber production might shift to other countries with possibly less stringent environmental regulations. This could lead to increased deforestation and CO_2 emissions in those other countries, reducing the net effect of CO_2 reduction.
4. **Regulatory provisions and market guidelines**: European and national regulations for the use of land and forestry projects for issuing CO_2 certificates are strict. The EU

Emissions Trading Directive (EU-ETS) includes specific provisions that limit the use of land-use changes and forestry projects. These provisions aim to ensure that only genuinely additional and verifiable CO_2 reductions are included in emissions trading.

Overall, these regulations aim to ensure the integrity and credibility of CO_2 compensation systems, ensuring that the reported emission reductions actually occur and are not otherwise compensated.

In permanent forests, trees are removed during thinning, most of which are very difficult or impossible to utilize for material use and are instead used for energy recovery. The proportion of material use in the permanent forest is around 30%, while the proportion of energy use is 70%. In pure softwood stands, the ratios are 30% energy and 70% material. This leads to a revenue difference of 400€/ha*a (the calculation can be found in additional material submitted in extra file) (see also Figure 4).

This difference makes it difficult for forest owners to manage deciduous permanent forests profitably and prevents large-scale, rapid conversion to prevent further large forest areas from being severely damaged by climate extremes in the future. If a forest area suffers a total loss due to a climate extreme, state and regional subsidy can be used to process and remove damaged wood, replant the stands, apply wax covers, irrigate and carry out maintenance measures. A company that has lost the ecosystem services of a forest area due to incorrect stand management is compensated by the subsidies for the establishment of a forest stand that, in the worst case, has the same low resilience as the previous stand.
If a forest provides long-term ESS by having a stable ecosystem and high resilience to climate extremes, its forest owners cannot apply for additional subsidies. The ESS provided are essential for a functioning society but are not rewarded accordingly. The forest owners cannot generate any income from the forest areas with these services.
The future forest premium was created in order to close the deficit of increased additional output of ESS and at the same time lower area revenues compared to pure conifer stands. Only functioning established forest stands have high ecosystem services, which is why preference is given to forest areas that are already in a converted state when awarding the premium, rather than those that still have the most potential.

Due to these facts, the valorisation system for CO_2 sequestration was combined with the cooling effect, recreation and water retention given by deciduous wood in order to promote also other relevant ecosystem services and to emphasis the increasing socioeconomic impact of climate change and, thus, the importance of socioeconomic valorisation of ESS (see also GA p59).

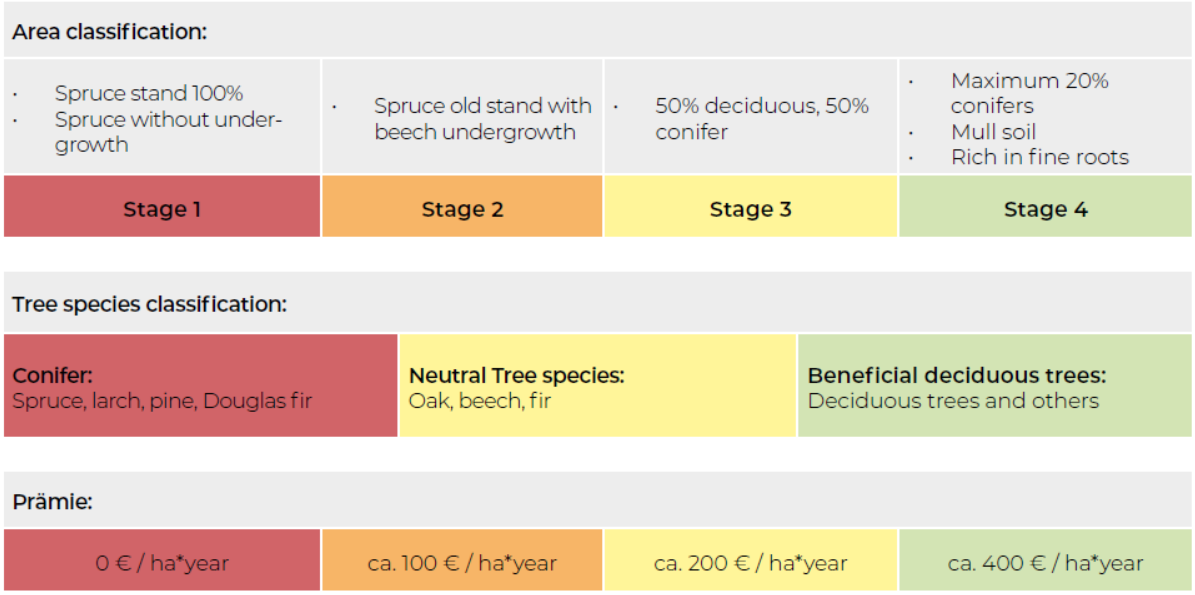


Figure 6: Future Forest and space classification and compensation. Categorisation of tree species used in the wood stands (Source: LIFE Future Forest)

In order to classify the forest areas according to their performance class, a tool for classifying forest areas (SA: Self-Assessment-Tool) was developed by the FutureForest project. With the help of the SA, stands can be classified into four different performance levels, as shown in Figure 6. Level 1 is the lowest level, whereas level 4 is the highest performing level.
The remuneration of the area classification is based on the difference between the area yields of pure conifer stands and permanent deciduous forests, as described above. The optimal management of a deciduous permanent forest suitable for grandchildren therefore receives the full amount of the revenue difference of €400. In proportion to this, level 3 and 2 are each rewarded with half € 200 and a quarter € 100 of the maximum amount respectively.
The amount of the payout is determined every five years through an evaluation of the area classification (SA) and is paid out over the next five years based on the assigned level. For level 1, a premium of €0 was deliberately chosen because the transformation of the area can be funded through state grants. This also avoids the risk of double funding.

Forest owners participating in the Future Forest Premium model do not have to base their silvicultural decisions on the criteria of SA level 4 but can act at their discretion. No one is forced to transform their forest areas according to level 4 criteria. However, participation in a free training on sustainable forest transformation for future-proof permanent deciduous forests, conducted by the Forest Owners' Association, is mandatory.
The funds used for the Future Forest Premiums are collected and managed in a fund called the Future Forest Fund (see Figure 7).

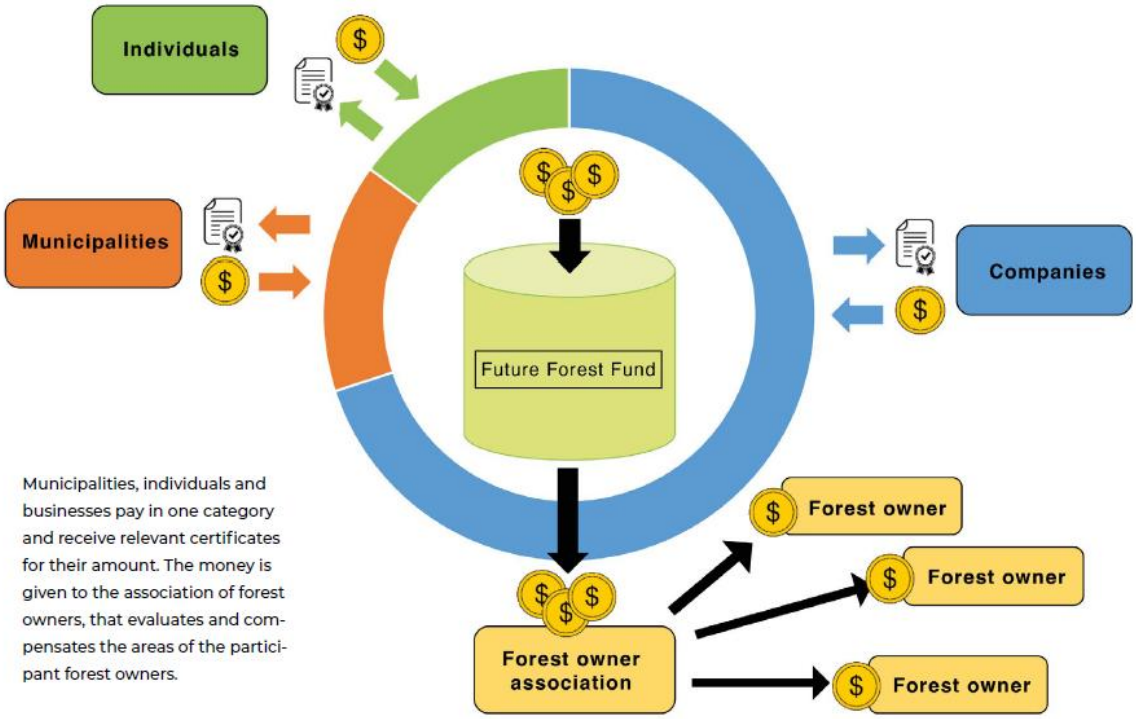


Figure 7: Structure of the LIFE Future Forest Fund

In the case of the Future Forest Premium Fuchstal, only papers were filled out which testify that the respective person wishes to participate in the premium with the listed forest areas. The project team later drafted a more refined document, which is divided into several paragraphs and is much more comprehensive. This document includes the aim of the Future Forest Premium, the conditions of participation, the termination options and the term of the contract. At the end, a signature is to be obtained from the participant and from the respective representative of the Future Forest Premium. The document can be found on the project website (www.klimaschutz-landkreis-landsberg.de/eu-life-future-forest/zukunftswaldpraemie-fuchstal) and with the additional documents.

The LIFE Future Forest Fund offers the opportunity to centrally collect funds from various interested parties and distribute them to forest owners in the form of the Future Forest Premium through a forest owners' association, as proposed in our model. The interested parties can include companies that wish to engage voluntarily due to their corporate social responsibility, municipalities that see a need for support in the transformation of private forests, and private individuals who voluntarily wish to offset their ecological footprint. Investors receive certificates equivalent to their invested amount.
The Future Forest Premium serves as symbolic certificates. They are not approved by an officially independent institution for the global carbon market. Nevertheless, they are intended to provide a financial compensation to forest owners for adapting their forests to increasingly severe climate extremes. Therefore, additional ecosystem services of permanent deciduous forests have been incorporated into the premium. The fact that they serve only as symbolic and cannot be used by private companies to officially compensate their CO_2 emissions, made it hard to gain funds. General interest is given, but concrete payment is not. However, it has to be stated that in times of increasing socioeconomic impact of climate change across Europe as well as the increase of constructive responses from policy (Green Deal, Circular Economy, Green Recovery strategies for declined economies due to COVID-19) and private industry, a compliant regulatory system that officially valorizes ecosystem services (ESS) is highly needed and will become more likely. This would work as a booster for

proliferation of sustainable regional or local economic cycles based on the socioeconomic valorization of ESS such as the Future Forest Fonds (and the Forest water premium (see below)).

Further, detailed information on the functioning of the Future Forest Funds can be found in an additional document called “Action_B.3_Valorisation system for municipal ecosystem services (and modelling of the integration of the results into political decision-making)”.

Regarding the successful contacting of the German federal representatives of the national emission trading system (deliverable), the project team contacted the German Emissions Trading Authority (DEHSt) to see if there might be a possibility of cooperation. It would have been particularly interesting if the DEHSt had been able to offer a solution regarding the official CO_2-certificates. Unfortunately, however, the DEHSt did not reply much and was unable to help with the CO_2-certificates. In addition, they are pursuing their own forest conversion plan and were not interested in the results or in cooperating with the project.

Concrete implementation in Fuchstal: The "Future Forest Premium" pilot project was initiated and implemented in the municipality of Fuchstal to test and evaluate innovative approaches to sustainable forest management. The aim of the project was to motivate forest owners to make their forests fit for future challenges, particularly with regard to climate change, and to promote biodiversity at the same time. Even though the private company Hirschvogel, that promised to provide funding, got out on short notice and almost jeopardized the implementation of the Future Forest Funds, the team together with the most relevant stakeholder (mayor of Fuchstal and forest owner association) set up a simplified version of the Future Forest Fund and thus ensured a successful payment of over 10.000 EUR per year to 31 forest owners within the municipality of Fuchstal. The forest owner association will then train the forest owners regarding the maintenance of their forests and support the re-assessment after 5 years. Concrete detail on the implementation (pilot test drive) in the municipality of Fuchstal including our experiences and valuable hints for further users can be found in the deliverable “Action_B.3_Del.Pilot test report_FutureForestFond”)

Drinking Water Incentive

Due to climate change and prolonged dry periods, Germany is facing increasing problems with drinking water supply. A major reason for water scarcity is the inadequate management of agriculture and forestry, leading to the loss of essential water protection functions. Sustainably managed forests have the potential to significantly improve the quality and quantity of drinking water.

Proposal for a Drinking Water Premium LIFE Future Forest: Forest Water Premium: The LIFE Future Forest project proposes a straightforward incentive system, modeled after existing systems, to reward forest management focused on drinking water production. The Forest Water Premium aims to offset additional costs for maintaining continuous forests, protecting against browsing, and using maintenance wood. The premium is tiered based on the assessment of forests in terms of their drinking water protection and can be divided into three levels as shown in Figure 8.

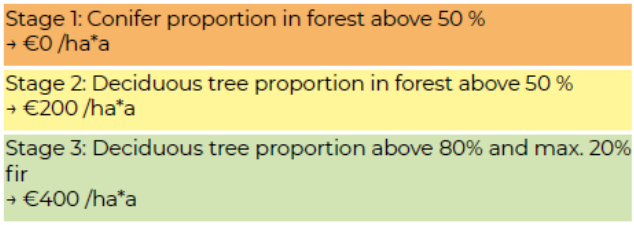


Figure 8: Three Levels of Forest Water Premium based on the percentage of deciduous tree species used in forest management

Pilot Project Forest Water Premium in the Schwabhausen Drinking Water Protection Area: In March 2024, a pilot project with forestry students was conducted to test the self-assessment tool for evaluating forest stands in Schwabhausen. A digital link with geoinformation data was established to improve the efficiency of the evaluation. Results indicated that a high proportion of coniferous trees negatively impacts groundwater recharge, leading to a recommendation to increase the proportion of deciduous trees.

Results and Conclusion: The pilot project showed that targeted measures to optimize water yields could significantly increase the water volume. Financially, the costs for the premium would amount to 24,400 euros per year for the water supplier. If these costs were passed on to the end consumer, the additional financial burden would be less than 20 cents per cubic meter of drinking water. This highlights the importance of strategic planning for water resource management to enhance both ecological resilience and economic efficiency.

Further information can be found in the deliverable “ActionB.3_Del_Pilot test report: water works´ incentive scheme”.

The work on the valorisation systems is documented and integrated into the Future Forest handbook (see E.2).
Action is fulfilled in co-work of HSWT and StadtL with support of LandkreisL.

Changes of action/budget (if relevant):
The strict priorisation of a CO_2-only certificate was removed to honour the overall ecosystem services of deciduous permanent forests.

Major problems/ delays of the action (+justification and impact on other actions):
Since the signing of the Kyoto protocol, Germany is obliged to show an emission restriction and -reduction plan. The counting of carbon sequestration in forest areas was part of this plan. As LIFE Future Forest was planning to include the compensation of CO_2 as well, the project faces the problem of double counting of CO_2. This problem affects other projects as well. Therefore, there is hardly any project in Germany selling carbon certificates due to the problem of double counting.
Till the end of the project there was no officially accepted certification of the FutureForest-certificates. The Certificates can only be traded on the voluntary offset market. Due to this fact it was hard to catch the interest of big companies for signing in as partners and donors. A large regional company had already promised to finance the costs of the pilot project and thus ensure that the regional ecosystem services of the forests would be valued, this promise was withdrawn the day before the information evening with the participating forest owners.

To react on this short notice and ensure the implementation of the premium and payout to the forest owners, the mayor of the municipality of Fuchstal agreed at short notice to provide the necessary funds for the pilot project. With this new situation given, him, together with the project team and the forest owner association agreed to rearrange the methodology in a simplified way. Instead of setting up the developed and planned concept that ensures a separated Fonds, where interested stakeholder can pay in incentives, the Funds payment was integrated into the municipality of Fuchstal. With only them willing to provide money for the forest owners at this moment it was not possible to vote in favour of implementing the fund via an association as planned. The municipality can forward the funds directly to the forest owners avoiding unnecessary costs and efforts via an association that needs to be established, taken care for and paid for (decreasing money available for incentives). Thus, the main aim to establish a regional system, based on voluntary engagement, could only be partly achieved, as due to the short notice exit of the interested private company for the pilot testing in Fuchstal, a simplified version of the Future Forest Fonds needed to be implemented. However, a concrete guidance on how to establish this association was provided for other municipalities that would like to establish the Future Forest Funds and where private companies and privates are willing to valorize ESS (to be found in the handbook on sustainable forest management (see Action E.2)) (see also “Methodology applied”).

Regarding the forest water premium, a proposal for apportioning the remuneration of private forest owners for the additional costs of forestry with the priority on drinking water production instead of timber production was discussed with the responsible drinking water suppliers.
The project teams assume that, due to the upcoming elections in Bavaria, none of the drinking water suppliers wanted to tackle such a politically sensitive issue as increasing consumers' costs for everyday resources and therefore showed us rather vague interest. The project team had many discussions with Mr. Ulrich Heindl from municipal utilities (Stadtwerke) Landsberg am Lech. Although he was always on the side of the project and would have welcomed cooperation, he signalized the team that his management and other colleagues were not prepared to take on the forest water premium. He was also of the opinion that the municipal utilities would also have legal difficulties here.
Unfortunately, our hands were tied as a result, and we were unable to record the payment of a bonus for forest owners as a success for this work package. However, the team invested their capacities into the elaboration of the concept to ensure that it is feasible to be implemented at later stage when political support is given.
Nevertheless, several replications are on their way, please find more information below under “Perspective for continuing the action after the end of the project”.

Mention any complementary action outside LIFE (if applicable):
None

Perspective for continuing the action after the end of the project:
After the end of the project, the FutureForest Fund will be continued in Fuchstal for at least five more years. The WBV will have the operative task of collecting fundings from companies and municipalities and forwarding them to the participating forest owners. It shall be set up in a self-sustaining way, financed by the valorisation systems, guarantying its long-term existence.

The extraordinary public relations work led to presentations on sustainable forest conversion in other interested municipalities, cities and counties like the municipality of Weil, Schlanders (Austria), Neukirchen-Balbini, Schwangau, and Windach, the city of Neunburg vorm Wald, Burghausen and Weilheim, the county of Dachau and Sonthofen. etc… to implement the Future Forest Conversion as well as the FutureForest Fund in the communal Forest management (for Neunburg vorm Wald see also supporting document: 20240321_Neunburg_vorm_Wald_Decision_FutureForest.pdf). The municipality of Scheuring has decided to start a future forest premium like the municipality of Fuchstal. The estimated start will be 2025.

Regarding the forest water premium, the employees of the climate protection management in the Landsberg am Lech district office and forester Ludwig Pertl will continue to try to establish this premium model, especially in the municipality of Weil. The new project at the district office, SOIL:OurInvisibleAlly, will continue to focus, among other things, on healthy, living soils and trees. In the course of these activities, attempts will be made to talk to local decision-makers and reach an agreement. Forester Pertl will also provide support.
Outside of the county of Landsberg am Lech, several persons/municipalities/companies showed their interest and, with the support of forester Pertl, started (or will start in 2025), to implement their forest water premium:

1) The BioMineralwasser e.V. association became aware of us, informed themselves about our system and is currently in the process of implementing this system of premium payments for forest owners in drinking water protection areas in its region of Upper Palatinate near Neumarkt in Bavaria.
2) The replication in Neunburg vorm Wald is progressing, the decision within the city council meeting was made in March 2024 (see also supporting document: Action_B.3_E.2_Replication_Neunburg_vorm_Wald_Decision) Concrete measurements are planned during a soil and forest week with students in June 2025, using two bachelor's theses as the basis for implementing the Future Forest Fund and potentially the forest water premium.(see also "Methodology applied").
3) A simplified version of the water premium is being carried out in Brandenburg, in the north-east of Germany, starting 2025. The company Dohrn & Timm has agreed to pay a water premium to forest owners near its plant. The funds will enable the forests to be converted according to the silvicultural principles of LIFE Future Forest, which will result in an additional 50 liters per m² per year of leachate. This means that for 50 hectares, 25 million liters more water will flow into the groundwater. The ultimate goal is for more water to be added to the groundwater than is extracted by the company.
   The forest owners involved are:
   - The Gäbert family with 11.34 ha, parcels 111+98/1+98/2 in the Großbeeren district, receiving approximately €1,200 per year in subsidies,
   - The County of Teltow-Fläming: plots no. 6141+6142 in the municipality of Jühnsdorf with 37.39 ha, receiving approximately €3,700 per year in funding.

   Forester Ludwig Pertl and the company Efficient Forestry (Dr. Sebastian Hauk) were responsible for the evaluation process of the forests. The app application (Action B.1) was also used in this process. Forester Pertl provided silvicultural advice to local forest owners. The contracts have an initial term of 15 years, with a reassessment of the areas occurring after 5 years. The overall balance thus shows approximately 49 ha of

forest and €4,900 in annual funding (note: depending on the change of level of the participating forest, the minimum amount supporting the forest owners will be €73,500 over the agreed 15 years (with €73,500 being paid to the owners even if the level of the forest status does not increase)).
The forestry administration of Brandenburg, represented by Dr. Kammer, who has already visited Landsberg am Lech, supports the project. She was present at the consultation and would like to establish a monitoring system. This marks the first instance where a company has voluntarily paid money to forest owners who manage their forests according to the principles of Future Forest.

Illustration of the action:
Please see Figure 5 and Figure 6 above.

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

Within this action two Premium systems have been developed. One system aims for the Ecosystem Services of a deciduous permanent forest, the other system aims for the quality and quantity of the drinking water production of forests in drinking water protection areas. Both systems were presented to stakeholders of municipality such as Mayors, forest administrations, forest owners, and forest owner association. Additionally, a round table with drinking water supplier and forest owners of belonging drinking water protection area forests took place to discuss actual problems in managing and honouring the work in such areas.

A pilot test drive of the Self-Assessment System with corresponding payout of FutureForest Premiums took place. The guaranteed payment of bonuses (over 10.000 EUR per year) for, in the end, 31 participants for the next 5 years in the municipality of Fuchstal can be considered as a great success.

One major problem was the lack of official certification for global certificate trading for the Future Forest Premium. Global certificate trading is not very clear and easy to understand for people who have never had anything to do with it. It therefore took a long time to discuss the possibilities and, above all, the aspects that are not possible.
In addition, there was a lack of funding for certification by an official certification body (such as Gold Standard or Verra). Even if certification had been started directly at the beginning of the project with self-developed methodologies, successful completion plus evaluation through a test run would have been unrealistic in terms of time. The project team assumes that this missing official certification led to the exit of the promising exchange with the interested private company on short notice.

During the project period, a remuneration system for the forestry of private forest owners within drinking water protection areas was developed. Within a drinking water protection area, the status quo of forestry with regard to the production of drinking water was determined. Even though responsible drinking water suppliers understood the concept, the increase of water prices came at the wrong moment (upcoming elections in Bavaria, high inflation due to Covid-19 and Ukraine war) and the forest water premium could not be implemented within the county of Landsberg. However, a theoretical implementation

(assessment of the area and potential costs) was conducted (see above), and several persons/municipalities/companies outside of the county of Landsberg am Lech showed their interest and will start their way towards a water incentive after the LIFE Future Forest concept.
Further Evaluation can be found in the deliverables on the pilot test reports mentioned above.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
B3: Valorisation system for municipal ecosystem services and modelling of the integration of the results into political decision-making	Objectives: • system for voluntary trading of regional certificates for CO_2 emission • quality and availability of drinking water provided by sustainable forests connected to regional water price via incentive system Expected results: • Draft on valorisation systems • Part 4 of handbook • Pilot test report: Water works' incentive scheme for sustainable forest • Draft on valorisation system • Pilot test report: CO_2 storage and regional emission trading • framework with the federal representatives of the national emission trading system	• Part 4 of the handbook • Pilot test drive on FutureForest Premium and report • Implementation of FutureForest Premium for five years in community of Fuchstal • Pilot test drive on self-Assessment for water incentive and report • Exchange with the federal representatives of the national emission trading system	• an association for the organizational work of the FutureForestFund is missing (simnplified implementation of Future Forst Fonds implemented in Fuchstal) • official certification of premiums is missing • with drinking water supplier unwilling to implement premium, Project team is unable to get further success, however first steps are taken to implement the system outside of the county.

Action C1: KPI measurement and project monitoring

Partner: HSWT

Foreseen start date: Sept 2020	Actual start date: Oct 2020
Foreseen end date: Dec 2023	Actual (or anticipated) end date: Sept 2024

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

KPIs

Key Project Indicators (KPIs) are specific metrics used to evaluate the efficiency and effectiveness of project processes. These indicators help to monitor the performance of your different areas, identify problems and make continuous improvements. The Key Production Indicators for the Future Forest project include a set of measures and outcomes that measure the success and progress of the project in different areas. These KPIs provide insight into the implementation of environmental and climate adaptation measures, sustainable forest management, planting of climate-resilient trees and ecosystem assessment and improvement. In addition, the KPIs provide an overview of socio-economic aspects and tasks of the project, as well as on communication and networking successes such as the reach achieved via the press and various media, foresters and forest owners trained on the Future Forest concept, events organised, or contacts made.

The project was particularly successful in the area of socio-economic aspects, where the targets set were significantly exceeded in some cases. The resulting reach and media presence of the topic is particularly helpful for the long-term success of the Future Forest concept.

Details on the different values can be found in chapter 7, the final report on KPIs (Del) and within the KPI webtool.

Socioeconomic analysis and life cycle assessment

A complete analysis was developed from the draft of the socio-economic analysis (Del). On the one hand, this deals with the general conditions in the district of Landsberg am Lech. This includes data on employees, inhabitants, commuters or various types of business, carbon footprints, land ownership distribution in the individual municipalities, education or tourism. Then various existing compensation systems are analysed as examples and the two premium models of the project (future forest premium and water premium) are presented. Various socio-economic calculation models are then briefly analysed and the influence of ecosystem services on various social and economic areas is assessed, and a brief SWOT analysis is carried out. Finally, conclusions are drawn and implications for political decision-makers, companies and society are formulated.

Within the scope of a thesis from HSWT a life cycle assessment (Del) was elaborated: “Life cycle assessment and economic analysis of the district's wood utilisation for energy purposes in Landsberg am Lech”.

Action is fulfilled in co-work of HSWT, StadtL and LandkreisL.

Changes of action/budget (if relevant):
None

Major problems/ delays of the action (+justification and impact on other actions):
None

Mention any complementary action outside LIFE (if applicable):
None

Perspective for continuing the action after the end of the project:
The monitoring of some indicators will be continued after the projects end. An evaluation of the KPIs takes place 5 years after the project´s end.

Illustration of action:

Figure 12: walnut planting

Figure 11: temperature measuring device

Figure 10: sycamore planting

Figure 9: Maintenance of the robinia area

Figure 13: Earthworm research

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions

A constant monitoring including an evaluation is seen essential by the project team to guarantee a successful implementation of the project. The different KPIs set show a great overview on the impact the project generated over its lifetime.

CINEA Letter 9.11.2022: C.1 Issue 8: Thermal analysis through fly-over

After cost approval, the team carried out a thermal analysis through fly-over to measure the change of humidity and temperatures. However, results could not be provided as expected. From an aviation law perspective, the day for the thermal flight could not be freely chosen. Unfortunately, the weather conditions that day were such that the forests were optimally supplied with water and evaporation. The conifers therefore had a higher evaporation rate than the deciduous trees. In conclusion, no evidence could be provided from the data about the benefits of deciduous trees in drought conditions. Furthermore, the quality of the thermal images was unfortunately completely inadequate for the desired purposes of depicting air flows or cooling effects. A new flight in better weather and with a higher camera resolution could not be carried out for cost reasons.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
C1: KPI measurement and project monitoring	Objectives: • monitoring of all LIFE FutureForest actions • analysis of the socioeconomic effects Expected results: • List of KPIs and respective monitoring tools • Final report on KPIs • Socioeconomic analysis • Life cycle assessment	• Measure devices monitored the environmental aspects (Action B.2 and C.1). • Project communication was monitored constantly, showing an active and successful communication and awareness raising (see also Actions D) • Final report on KPIs • Socioeconomic analysis • Life cycle assessment	Almost all KPIs could be reached, for communication indicators, the project team could highly overachieve the expected numbers.

Action D1: Project communication

Partner: LandkreisL

Foreseen start date: Sept 2020	Actual start date: Nov 2020
Foreseen end date: Dec 2023	Actual (or anticipated) end date: June 2024

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output/activity):

The website of the project was continuously updated with the newest information about past or upcoming events and the state of the project. A linking with the website of the Alpine Soil Partnership was not possible as their website is currently offline. However, the hosts are informed and will link the project and submit the Future Forest handbook at later stage. The Zotero database (Action A.1) is also linked on the website, as well as the application forms for the Future Forest premium. Social Media posts were also regularly posted when a message was of interest for the population. The press was informed regularly about upcoming events to give them the possibility to take part. A very important journalist was Florian Regensburger, who repeatedly publicized the project on Bavarian radio and Bavarian television. The project was steadily in contact with him. Whenever a soil and forest week took place, he accompanied it. Another important person was the YouTuber Florian Rigotti with his YouTube channel "Selbstversorger Rigotti". He has over 300 thousand subscribers and contributed several videos to the public relation of Future Forest. The very numerous press releases and publicity campaigns were recorded in a large spreadsheet (see additional documentation: "Action D.1-3_Public_relations_list_Future_Forest"), demonstrating the reach to our indicated target groups.

The deliverables were all written in simple language to address all target groups.

Laymen's report

The project has published a practical version of the handbook for sustainable forest conversion (instead of as a flyer as indicated in the GA. The flyer has already been produced in 2021). This is a slimmed-down version of the handbook and is largely limited to the topics that are necessary for practical use. This practical version has been translated and published as a .pdf in English. It can be found on the website at https://www.klimaschutz-landkreis-landsberg.de/eu-life-future-forest/handbuch-fuer-nachhaltigen-waldumbau/. The section entitled "The Project", in which the project itself and its successes, as well as the framework conditions are explained can be found at the end of the report.

Figure 15: The German version of the Laymen's report

Figure 14: Laymen's report of LIFE Future Forest

Was the objective reached? What reactions and feedback were obtained?

The output of high-profile campaigns and press releases was enormous and went far beyond what was required. This can be clearly seen in the KPI report. Many values exceeded their target value many times over. Above all, this is thanks to forester Ludwig Pertl, who made optimal use of his 40 years of professional experience, his very large network and his specialist knowledge of permanent forests and ecosystem services to reach a large audience. The Future Forest topics were discussed and explained directly on site in the forest during numerous forest walks. The app application developed by Sebastian Hauk (see Action B..1) was also demonstrated in this way and attendees were able to test it live on site with their own cell phones. Almost all the guests were either professionals working on forests or forest topics or forest owners. Only very rarely did people come who merely had a personal interest in the forest and the topic. The main reason is probably that these people cannot change anything in their private lives in regard to the forest as a result of the new information if they have no decision-making power over the forest in any form, which means that there is no concrete incentive for them. However, the project was able to reach a lot of those people who do have some form of decision-making power. These included forest owners, foresters, hunters and scientists.

Action is fulfilled by LandkreisL.

Changes of action/budget (if relevant):

As mentioned above, the Laymen´s report was not published as flyer (flyer was published already in 2021) as indicated in the GA, but as short, practical version of the handbook. This

creates added value as it ensures more forest owners getting to know the sustainable forest management practices of LIFE Future Forest.

Major problems/ delays of the action (+justification and impact on other actions):
None

Mention any complementary action outside LIFE (if applicable):
None

Perspective for continuing the action after the end of the project:
The Notice Boards and the website will stay for at least 5 years after the project LIFE Future Forest has ended. Forester Ludwig Pertl is, although not getting paid and working for the project anymore, still cooperating with different Stakeholders to implement the forest model and premium systems as much as possible. The follow-up INTERREG Alpine Space project SOIL:OurInvisibleAlly, where the county administration of Landsberg am Lech is taking part in as Project Partner, will also have its focus on soil. Therefore, the thematic content will be further disseminated, especially the Future Forest Handbook.

Illustration of the action:

Figure 16: Forest Walk at the final conference in June 2024

Figure 17: TV report about the project in September 2023

Figure 18: Forest prize winner Raimund Hofmann (left) and forester Ludwig Pertl at a podcast recording

Figure 19: Presentation at the final conference in June 2024

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

The communication strategy is an essential tool for the project communication as it provides guidelines, templates, and a roadmap for the project lifetime, where the project partner can fall back to.

Poster, notice boards and website are a classical and important tool to inform interested stakeholders and citizen on the project. Anyhow, to increase the reach to the public, further activities are necessary (see Action D.2).

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
D1: Project communication	Objectives: • Regular public relation work • Laymen's report	• Public relation work was highly successful, target values were exceeded highly • A Laymen's report in English has been created and published	The public relation work was outstanding. The Laymen's report was successfully published.

Action D2: Citizen Information at county level

Partner: LandkreisL

Foreseen start date: Sept 2020	Actual start date: Sept 2020
Foreseen end date: Dec 2023	Actual (or anticipated) end date: June 2024

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output/activity):

Regular update of the "Klimaschutzkonzept"

As part of the European Energy Award (EEA) process in 2023/2024, the topic of climate change adaptation was addressed and the climate protection concept from 2013 was updated. As a result, the 2030 climate mission statement for the district of Landsberg am Lech was adopted. This was done by the district council and is therefore legally binding. It represents the update of the 2013 climate protection concept. Among other things, it states that the district's activities also include measures to improve sustainable economic practices (including forests), behavioural change and CO_2 sequestration.

Organisation of at least two county wide events in the framework of the county's climate actions for the entire area

In order to further inform the citizens of the county of Landsberg am Lech about the project and to involve them, if possible, the project organized two county-wide events, plus one extra event. The events were: The exhibition in June 2022 in the Landsberg am Lech district office "Forest: an all-rounder", the final conference of the project (final event) in June 2024 and as an extra the multi-geocache in Markt Kaufering. All events were successful, the detailed descriptions can be found in the corresponding deliverable ("Action D.2_Del. 2_citizen_information_events_related_to_LIFE_Future_Forest"). Via different channels (e.g. website, social media, personal mails, press, newspaper) interested target groups were informed and invited to those events.

Organisation of an annual "soil and forest event week"

The soil and forest event weeks (Deliverable) in cooperation with the HSWT continued to take place. As planned, two soil and forest event weeks took place each year, one in March and one in September. The last one took place in March 2024. The students were very supportive for the project through their work. There was always a presentation evening with an audience on the penultimate day of each project week to reach the expected target groups and inform forest owners, forest authorities, mayors, companies, and citizens on LIFE Future Forest and the results obtained during the event week. As stated before, press was present at those events, as well, increasing the reach out also after the event. The soil and forest event weeks are expected to continue after the end of the project.

Take up and further development of initiatives that support the forest transformation

In the project application, it has been suggested that the project team works together with the KARE model region and the KlimaFIT initiative. In practice, the project found more suitable networking partners and has worked closely with them (e.g. IG Gesunder Boden (interest group healthy soil), Foundation Art and Nature, Aufbauende Landwirtschaft (Building Agriculture), Organic farmers in Germany, BDF (Association of German forest owners), etc).

In an online survey for the public, the KARE model region integrated a question of how severely the forest is affected by climate change. Two thirds of the participants answered that the forest is only slightly affected and only just under a third answered “severely affected”. This shows that many citizens are not sufficiently aware of what is happening in the forest. To change this, however, the project team preferred to work together with, for example, the Art & Nature Foundation, which informs citizens in an artistic way through regular campaigns and action days. The foundation also supported a complete soil and forest event week (March 2023) with board and lodging and worked together with the students. At the end, there was a lecture evening with a panel discussion at which the students also presented their results.

Regular report from the round table discussions and the project progress in the regular information updates on climate action in the county area

The round tables took place regularly and kept all close stakeholders, mainly the mayors of the participating municipalities, up to date on the project. Each round table was documented and communicated via the website (https://www.klimaschutz-landkreis-landsberg.de/eu-life-future-forest/home-aktuelles/). Various round tables communicated via the website can also be found in the Deliverable on the five information updates publicly available (“Action D.2_Del. 5_information_updates_on_LIFE_Future_Forest_publicly_available”).

Integration of official networking partners into the information loop and active invitation to participate in the project progress

Partners who supported the project were the Aufbauende Landwirtschaft (Building agriculture) with its director Stefan Schwarzer, the Interessensgemeinschaft Gesunder Boden (Interest Group Healthy Soils) and the Foundation Art and Nature, Organic farmers in Germany, and, during the project´s end the BDF (Association of German forest owners). Stefan Schwarzer, for example, was personally present at several soil and forest event weeks and supported them. He also contributed various presentations at events, which helped to inform the audience about a broader spectrum beyond the project. All three partners also shared information about the project via their information channels: Stefan Schwarzer mentioned the project in his blog on regenerative agriculture, the Healthy Soil Interest Group invited forester Pertl to speak at their annual, very large “Soil Day” event, among other things, and the Art & Nature Foundation supported an entire soil and forest event week of the project with board and lodging. They organized an information evening to match, and a few weeks later project manager Nikolaus Storz was present at the foundation's “Spring Festival” with a stand for the project. All three partners also received a contingent of the handbook and the practical (short) version to distribute them among their people.

Another important partner in the project towards the end was the Association of German Foresters (short: BDF). Around 60 percent of German foresters are members. Ulrich Dohle, the federal chairman, contributed a quote on the practical handbook version, and the BDF also actively disseminated the project via its information channels. A call was also made to all German universities involved in forestry to acknowledge the LIFE Future Forest project and incorporate its findings.

Integration of private sectors stakeholders (companies) into the project progress, especially with regards to setting up a CO_2 emission -certificates system (B3)

In the course of developing a CO_2 emission certificate system (B3), the project team sought contact with large companies in the Landsberg am Lech district. Hirschvogel and Hilti are the

most notable of these. The company corpuls, a medical technology manufacturer in Kaufering, was also approached, but immediately declined. Hilti, which is one of the largest companies in the district with around 500 employees at its Kaufering site, invited forester Ludwig Pertl and Prof. Stefan Wittkopf from the HSWT to a meeting, however declined as no official CO_2-certificates could be generated from the Future Forest Funds.
Greater success became apparent when the project discussed the issue with Hirschvogel. The company has over 2,000 employees at its Denklingen site (near Fuchstal) and around 6,200 around the world. The contact persons were Mr. Christian Hinsel and Mr. Sebastian Gschwill. The two accompanied the project for six months. Participation was never questioned, and the cooperation was always positive. In the course of this process, Mr. Hinsel also made a verbal commitment of €10,000 to be paid to the Future Forest Funds. Later, this statement became five, then only two thousand euros. Approximately three weeks before the crucial event in Fuchstal, at which the forest owners were to be informed about the start of the premium system, Mr. Hinsel stopped getting back to the Future Forest team and no longer answered emails and phone calls. Just four days before the important event, on Friday afternoon, the project team received a long email from Mr. Hinsel stating that he was cancelling the project. The email was filled with excuses, half-truths and pretexts. It was only because the mayor of Fuchstal, Mr. Erwin Karg, kept his promise of €10,000 (per year) that the Future Forest Premium could take place and be announced. The project team replied to Mr. Hinsel with a lengthy email themselves in which all arguments were refuted. In the end, the time spent with Hirschvogel was a waste. As a result, there was no time to look for a new sponsor in a hurry. Sparkasse Landsberg-Dießen (bank institute) was also approached shortly afterwards, whereupon project manager Nikolaus Storz gave a presentation on the project and the Future Forest Premium scheme at the Sparkasse headquarters in Landsberg. This was also followed by a rejection after a few weeks of waiting, no reasons were given for the rejection. In mid-2024, the municipality of Scheuring announced that, like Fuchstal, it would also introduce a future forest premium, which would be paid by the municipality. Start date is expected to be 2025.

Different measures for Action D.2

The press (newspapers, radio and television) was always informed about important events and new developments in the project. This led to numerous articles by representatives of the press during the course of the project (see also Action D.1 and the table in which all publicity campaigns and press releases are published (additional documents: “Action D.1-3_Public_relations_list_Future_Forest”).
As stated in the Mid-Term Report, the project team has released an image film in early 2022. The image film can be viewed on the project homepage (https://www.klimaschutz-landkreis-landsberg.de/eu-life-future-forest/). It summarizes the project content briefly and well and is a good addition to the rest of the project's public relations work.
It is worth mentioning that private forest owner Raimund Hofmann, who has supported the project since 2021, won the German Forest Prize 2022 in the “Forest Owner of the Year” category. Raimund's forest is one of the Future Forst project's prime examples of what a forest should ideally look like.
The training courses for forest owners and forest workers took place as planned and were executed by forester Pertl. The values can be found in the KPI table.
The website was updated and changed to reflect the end of the project.

The project team took part in several prize competitions (additional documents:" Action_D.2_Pulic_Relations_Prize_Competitions"). In the year 2021 Ludwig Pertl won the German forest prize and the year after the private forest owner Raimund Hofmann. After that, several attempts were made to win other prizes, but unfortunately none was won.

Was the objective reached? What reactions and feedback were obtained?

The project team did an outstanding job on this action and went far beyond the required workload. Great response was received from citizens, political decision-makers and other target groups.

Changes of action/budget (if relevant):

None

Major problems/ delays of the action (+justification and impact on other actions):

No Company could be found willing to pay for the Future Forest premium. The Premium could still take place in a simplified way (see Action B.3) since the municipality of Fuchstal paid out alone.

Mention any complementary action outside LIFE (if applicable):

None

Perspective for continuing the action after the end of the project:

Those responsible at the Landsberg am Lech County administration will continue to incorporate the results of the project into their public relations work.

Illustration of the action:

Figure 21: Raimund Hofmann wins the German forest prize 2022 in the category "forest owner of the year"

Figure 21: Exhibition opening at the Landsberg am Lech District Office (county wide event)

Figure 20: September 2021 project week group photo

Figure 22: Scene in the image film

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

Two county wide events have been carried out and were successful, although in case of the two in person events, a few more guests would have been great. To gather people outside of the forestry sector turned out to be hard. The annual soil and forest event weeks were stressful every time but always helped to achieve important results with the help of the students and to present them to the stakeholders. Several important initiatives like the Art & Nature foundation supported the project very much. They have also been integrated as official networking partners and supported the project via their communication channels. Round tables were held regularly and informed the majors about the current state of the project. The project failed regarding the integration of private companies into the CO_2-certification system. The companies were only interested in official CO_2-certificates, which the project was unable to deliver (see Action B.3). Fortunately, Mayor Erwin Karg kept his word, allowing the Future Forest Premium to take place in a simplified way. The additional image film was very well received and generated good publicity.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
D2: Citizen information at county level	Objectives: • Two county wide events • Annual "soil and forest event weeks" Expected results: • 2 annual "sustainable forest event days" • Take up and further development of	• The two county wide events were successfully done and extended to a third one: A Multi Geocache in Kaufering • Every year in March and September, a soil and forest event week has	The project was very successful in carrying out the D2 actions and exceeded what was asked for in the project proposal

	initiatives that support the forest transformation • Regular report from the round table discussions and the project progress in the regular information updates on climate action in the county area Integration of official networking partners into the information loop and active invitation to participate in the project progress	been carried out, eight in total. • Information about the latest round tables has been published on the website • Official networking partners have been integrated to participate in the projects progress • An image film has been made and published	

Action D3: Integration into an EU wide replicability system and connection to policy Networks

Partner: LandkreisL

Foreseen start date: Jan 2021	Actual start date: April 2021
Foreseen end date: Dec 2023	Actual (or anticipated) end date: Sept 2024

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output/activity):

To ensure a successful communication and networking on EU wide level and in policy networks, the project developed an EU replicability integration and policy network connection roadmap (Deliverable). This communication concept was developed in order to conceptualise not only the transfer of knowledge from the project, but also the integration of networks and stakeholders as multipliers and the active participation of third parties in the project in the development of the measures. The target groups reached can be found in the additional document "Action_D.3_Zielgruppenanalyse_für_die_Kommunikation_auf_überregionaler_bis_EU-Ebene".

Active push for the replication on county area during an information event on county level with participation of representatives of large networks (Deliverable)

A conference in the district of Landsberg am Lech has been carried out from 21.09. to 22.09.2023. The conference consisted of illustrative practical examples in forests (forest walks), presentations of the research results by the HSWT students and the project team, technical lectures, a panel discussion and artistic performances. 23 people were present at the first day of the Symposium and about the same number on the second day.

Active communication and engagement with policy networks

During the project duration, the project visited various policy networks (Deliverable), presented the project and networked with the participants. These included: The EU Mission Soil Week 2023 in Madrid (Spain), the Forum for the future of agriculture 2024, the 18th meeting of the Alpine Convention Soil Working Group 2024 and an EUSALP working group 6 meeting 2023. The district of Landsberg am Lech also decided to join the Alpine Soil Partnership in March 2023 within which other municipalities can be reached. The next newsletter, which will be sent out via the Alpine Soil Partnership, will furthermore direct people to the English version of the handbook.

Active participation at the GreenWeek in Brussels

LIFE Future Forest participated in the Green Week in Brussels 2023 both through a satellite event and by attending the conference in Brussels. The project team also took advantage of its presence in Brussels and met with Ms. Ulrike Müller (MEP) for a network meeting. The project team also presented its project to the Directorate-General for the Environment (DG-ENV).

Academia: HSWT networking with other universities

Next to the training of students during the soil and forest event weeks (see also Action B.2), the HSWT networked with other universities during different events and conferences, for

example the XIII International Scientific Agriculture Symposium "Agrosym 2022" or at the Eco Field days Conference (see additional document: Action D.1-3_Public_relations_list_Future_Forest.pdf). Furthermore, a concept for a doctoral thesis (deliverable) was submitted for Christian Diehl, who is working on the project as a research assistant. The topic is the regional survey, evaluation and compensation of forest ecosystem services. Part of the work programme in the doctoral project should be a literature review, research on the accounting of ecosystem services, design of a valorization system, supervision of student projects and theses, publication of the research results. The doctoral project should be completed within three years.

Sustainability strategy

A sustainability strategy has been drawn up with the aim of ensuring the replicability and transferability of the project results to other regions in Germany and the EU. It identifies potential markets and possible cooperation partners to support and promote compensation systems for the enhancement of forest ecosystem services. It consists of a market analysis, the business models and scenarios (with the Future Forest Premium and the Forest Water Premium), site selection and transferability as well as the cooperations and networks working with the Future Forest project.

Was the objective reached? What reactions and feedback were obtained?

The project team has successfully managed to make its voice heard within the EU-wide networks. Influential networks were reached through participation and project presentation at the EUSALP working group 6 meeting in November 2023 and also especially through participation in the EU Mission Soil Week in Madrid, Spain in November 2023, where the project team was invited to present the project as best practice example. The invitation to this event was not a matter of course and shows that the project is seen and recognized internationally. The visit to Brussels for the Green Week 2023 was also combined with an additional presentation for the DG-ENV followed by a discussion, as well as an exclusive meeting with Ms. Ulrike Müller (MEP). The people present at the meetings were very positive and open-minded about the project.

Changes of action/budget (if relevant):

None

Major problems/ delays of the action (+justification and impact on other actions):

None

Mention any complementary action outside LIFE (if applicable):

No concrete actions. Anyhow, the project currently supported the project development of an INTERREG Alpine Space Project in Priority 1 towards climate resilient and green alpine region (Specific objective: Promoting climate change adaptation and disaster risk prevention, and resilience, taking into account eco-system-based approaches). The project proposal was accepted and with the start of 1.9.2024, SOIL:OurInvisibleAlly will work on transnationally replicable practices for local and regional sustainable soil management actions to safeguard ecosystem services and operationalize the resilience of Alpine land uses to climate change. The CoB/ the county Landsberg am Lech is Project Partner and will include pilot sites in this

project to further ensure and expand the sustainable forest management on the one hand and to include agricultural land (no subject to LIFE Future Forest) on the other hand.

Perspective for continuing the action after the end of the project:
In particular, the participants from HSWT, the Landsberg am Lech County administration and additionally blue! advancing european projects will continue to disseminate the project and its content in EU-wide networks after the end of the project.
Furthermore, as mentioned above, the Landsberg am Lech District Office will participate in the new EU INTERREG Alpine Space project named “SOIL:OurInvisibleAlly”. LIFE Future Forest will form the basis for the content of the new project. The HSWT will also remain in contact with larger networks after the end of the project and communicate the project content.

Illustration of the action:

Figure 23: Forest Walk on 21.09.2023 in Scheuring

Figure 24: Symposium LIFE Future Forest Day 2 - Audience

Figure 25: Satellite event of LIFE Future Forest: Forest walk in the forest by Raimund Hofmann

Figure 26: Network meeting with Ms. Ulrike Müller (MEP)

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

The project reached out to relevant transnational networks and policy stakeholders to enforce replication upscale and political uptake of sustainable forest management. The team

was certainly successful in the sense that the project and its content were communicated, in other words, a seed was planted in people's minds. Whether this seed will now sprout remains to be seen. When it comes to the forest, there are many opinions as to what should be done with it and how to proceed. There are also, not to say especially within the EU, other efforts to shape the forest of the future. The focus is very often on closing off forest areas that are no longer to be used (set-aside) to a certain percentage or completely. The project team does not consider this aspect to be sensible. The topic of healthy, living soil is still very new and requires a lot of communication. It should also be noted that a successful EU-wide implementation of the Future Forest Premium model will probably only be possible once the question of funding has been clarified on a large scale. The project team fought hard within the scope of its possibilities to convince as many individual institutions as possible to integrate the silvicultural measures in a comparatively short time and, if possible, to supplement a future forest premium or a forest water premium. The costs for the measures applied were minimal, which means that the efficiency can be rated as very good.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
D3: Integration into an EU wide replicability system and connection to policy networks	Objectives: • dissemination of project results and impacts • Active push for replication on county area • Active communication and engagement with policy networks • Active participation in the Green Week • Network with other universities Expected results: • 1 visit at the GreenWeek in Brussels • 1 Information event on county level with participation of representatives of large networks • EU replicability integration and policy network connection roadmap • 1 concept for a phd or master thesis • 2 visits to relevant policy network working groups • Sustainability strategy	• An information event on county level has been carried out • The project team visited the GreenWeek conference in Brussels, had a presentation with DG-ENV and met Ms. Ulrike Müller (MEP) • An EU replicability integration and policy network connection roadmap was developed • A concept for a phd or master thesis was submitted • 2 visits to relevant policy network working groups have been done • A sustainability strategy has been made •	• The project team did very well in communicating their project and networking with large networks. • Policy network groups have been visited and well informed about the project • The project was able to achieve a great deal with little financial input and worked efficiently •

Action E1: Project management

Partner: LandkreisL

Foreseen start date: Sept 2020	Actual start date: Oct 2020
Foreseen end date: June 2024	Actual end date: Sept 2024

Technical progress

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

As foreseen in the Grant Agreement, the CoB manages the project management together with an external consultant contracted for the support of LIFE Future Forest (project secretariat & hotline).

Internal communication takes place via project meetings (mainly online every 2-4 weeks depending on the need), a collaboration platform (Sync & Share), and information of PP on controlling, reporting and other aspects.

Project coordination: The steering group was involved in all decisions-making. Reporting took place in a joint manner: all PP provided information to their main actions. This information was than gathered and merged into the overall reports (Mid Term, Final and 2x Progress report). PP were cross reading the reports for correctness of all information provided.

Regarding financial issues, the financial management staff of all PP updated the financial statements on regular basis and sent it to the external support for overall budget monitoring. The PP were informed on regular basis on their over- and underspending, leading to smaller budget shifts within the flexibility (Shift of budget from StadtL EE to HSWT Staff & LandkreisL Staff and a shift of 14 % between cost categories (see also Chapter 8).

The project monitoring regarding deadlines and production of outputs took place on a regular basis and was discussed with the PP at every project meeting to guarantee a successful project implementation in time. As a timely delay occurred at the beginning of the project, the project team applied for a project prolongation which was accepted and the amendment no. 1 to the Grand Agreement signed in September 2023.

Within the cooperation of Action C.1 and E.1, the final KPI values were inserted into the KPI webtool.

Please also see Chapter 8.2 Accounting system and 8.3 Partnership agreements for further information.

Action is fulfilled by LandkreisL with support of StadtL and HSWT.

Changes of action/budget (if relevant):

None

Major problems/ delays of the action (+justification and impact on other actions):

None

Mention any complementary action outside LIFE (if applicable):

None

Perspective for continuing the action after the end of the project:

Finalization of the final report & clarifications.

Illustration of the action:

none

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

The action proceeds according to work plan.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
E1: project management	Objectives: • Set-up of management activities and update of work plan with regards to administrative procedures • Project secretariat and hotline • Internal communication • Project co-ordination and decision-making and reporting • Financial management and controlling • Project monitoring Expected results: • financial and technical project reports • Diary of co-ordination meetings back-to-back with round table meetings • 2x3 individual controlling report for the partners • Extraction of project data from the KPI webtool	• Project secretariat • Decision-making, Reporting, financial management, controlling and monitoring • Diary of co-ordination meetings back-to-back with round table meetings • Individual controlling reports for PP • Inserting of final KPI values into KPI webtool	The project management structures supported the progress of the project implementation and monitored the implementation process and spending on partner and project level.

Action E2: After LIFE: Long term communication and replication plan

Partner: HSWT

Foreseen start date: Jan 2023	Actual start date: Jan 2023
Foreseen end date: Dec 2023	Actual (or anticipated) end date: Sept 2024

Technical progress/

Activities and outputs within the action in quantifiable terms (+ by whom they were done + compared with planned output):

Development of the handbook

The handbook for sustainable forest conversion summarises and presents the key aspects of forest conversion from a Future Forest perspective, the vitality of the soil and the financial value of the ecosystem services that functioning forests have so far provided to society free of charge. Development of the handbook began in early 2023. The following aspects are important parts of the handbook

- fundamental aspects on the topic of forests in Germany and Bavaria, as well as the effects of climate change on forests
- what are ecosystem services and what value do they have
- what does the future forest look like, what is living soil, why is permanent forest important
- self-assessment tool and its application as well as examples and positive examples of successful forest conversion
- how does the future forest premium work
- how does the water premium work
- results of previous research on elementary points (earthworm, growth, water quality, ...)

The handbook was finalised and printed at the beginning of 2024. It is also available for download on the Landsberg am Lech District Office website.

Following the manual, a short version was developed, which is intended as a practical guide for forest owners. This provides a clear overview of key aspects such as future forest, living soil and forest management goals. It also focuses on the self-assessment tool and water compensation (development, planning and implementation). This short version was also translated into English to ensure further distribution. This version also represents the Laymen´s report (Del, D1).

AfterLIFE plan

The AfterLIFE plan elaborated shows different measures that the CoB and the ABs will conduct after the end of the project to ensure visibility, usage and replication of the project results. Among other, it defines the after-LIFE objectives and methodology and focuses on communication measures. It also incorporates the exploitation plan giving insights in the different future tasks of the LandkreisL, StadtL and HSWT (e.g. long-term maintenance plan, annual soil and forest event weeks, education of future foresters, etc).

The replication plan which also includes an overview table of already running, currently starting and promising future replications is delivered separately.

Action is fulfilled by LandkreisL with support of StadtL and HSWT.

Changes of action/budget (if relevant):
For better overview and to avoid doubling of work, the exploitation plan (Del) was integrated into the AfterLIFE plan (Del).

Major problems/ delays of the action (+justification and impact on other actions):
n/a
Mention any complementary action outside LIFE (if applicable):
n/a

Perspective for continuing the action after the end of the project:
The CoB and ABs will further distribute the handbook to their networks and ensure the implementation of the AfterLIFE plan-activities.
Furthermore, as a result from the project, the Dauerwaldakademie (English: Academy for permanent forests) is currently established. With strong partners such as the University of Weihenstephan-Triesdorf (HSWT), Wilhelm Bode (permanent forest expert), Raimund Hofmann (as a practical example), Ludwig Pertl (Living Soil expert), and Stefan Schwarzer (Water cycle expert), the academy provides extensive support and expertise. A two-day conference is planned for 2025 to officially launch the academy, with both online and on-site options. This event will act as a catalyst for further dissemination of the Future Forest methods, providing expert knowledge and sharing best practices. A funding request to the German Federal Environmental Foundation for €170,000 has been submitted for the Dauerwaldakademie, and it is expected to be approved by early 2025 (changes for approval are high as proposals from forest award winners are favoured and two of them are part of the Dauerwaldakademie-team). The submitted project proposal can be found with the supportive documents (“Action_E.2_Project_proposal_Dauerwald1 & 2”).
Additionally, a proposal to the Waldklimafonds for a project volume of €3 million, which includes the Forest and AI initiative and Future Forest concept, will be submitted on 30.09.2024,
These funds are essential to accelerate national replication efforts and provide the necessary resources for training and technical assistance.

Illustration of the action:

Figure 27: Future Forest Handbook for sustainable forestry

Evaluation of Project Implementation

Methodology applied: Discussion of the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions:

The set up of a handbook which sums up all relevant information and learnings from the project and a simple and applicable ways supports long-term sustainability and usage of the elaborated work. This is also reflected from external stakeholders and multipliers who were eager to receive the printed handbook and use it and forward it in their networks. The AfterLIFE plan is seen as highly relevant internal document compassing the CoB and ABs to further distribute the project findings and support replications in the county and beyond.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
E2: After LIFE: Long term communi-cation and replication plan	Objectives: • long-term sustainability of project activities and results Expected results: • After-LIFE plan • Finalised handbook for sustainable forestry • Replication plan • Exploitation plan	• Several replications of B2 already starting • AfterLIFE plan, incl. exploitation plan • Handbook for sustainable forestry • Replication plan	The handbook (long and short versions (Laymen´s report) received very positive feedback and was requested from our stakeholders. The AfterLIFE plan will ensure long-term sustainability of the results (e.g. Handbook, self-assessment app, valorisation systems)

6.3 Main deviations, problems and corrective actions implemented

Describe the main problems or difficulties encountered in the project duration. These may be issues of a technical nature (equipment delivery delayed, construction of infrastructure took longer than anticipated), or financial (the costs did not correspond with the budgeted amounts) or organisational (change of partnership). Provide an assessment of the impact of these deviations on the outcomes of the project and describe the measures taken / to be taken to overcome or alleviate the problems in question.
If the project seems likely to become/stay behind schedule, please indicate this clearly. Signal any changes to the baseline implementation programme.

B2 Action

The project team was responsible solely for planning the planting on the private project partners' land. The municipal areas, however, were all planned and executed by the district forester in charge. Consequently, the project's influence on the selection of tree species was quite limited, as there were some differences between the goals of the Future Forest concept and the objectives of the forester. Most forest owners continue to rely on well-established tree species that generate the highest profits from timber. Shifting this mindset is happening gradually and still requires considerable advisory efforts and lobbying. Nevertheless, the extensive public relations work carried out by the Future Forest project provided strong momentum, initiating discussions and fostering new ways of thinking. Reporting the planting figures to the project by the forester was also occasionally complicated, often requiring numerous follow-ups before the data was made available.

B3 Action

Since the signing of the Kyoto Protocol, Germany has been obligated to present an emission reduction and restriction plan, which includes accounting for carbon sequestration in forest areas. As LIFE Future Forest aimed to incorporate CO_2 compensation, the project encountered the issue of double-counting carbon sequestration, a challenge that affects many other projects as well. For this reason, there are hardly any projects in Germany offering carbon certificates due to the risk of double counting.
By the end of the project, there was still no officially recognized certification for the Future Forest Fonds. These certificates could only be traded on the voluntary offset market. This limitation made it difficult to attract large companies as partners or donors. A major regional company had initially pledged to finance the costs of the pilot project, ensuring that the regional ecosystem services of the forests would be valued. However, this commitment was withdrawn the day before an information session with the participating forest owners in Fuchstal. To react on this short notice and ensure the implementation of the premium and payout to the forest owners, the mayor of the municipality of Fuchstal agreed at short notice to provide the necessary funds for the pilot project. With this new situation given, him, together with the project team and the forest owner association agreed to rearrange the methodology in a simplified way. Instead of setting up the developed and planned concept that ensures a separated Fonds, where interested stakeholder can pay in incentives, the Funds payment was integrated into the municipality of Fuchstal. With only them willing to provide money for the forest owners at this moment it was not possible to vote in favour of implementing the fund via an association as planned. The municipality can forward the funds directly to the forest owners avoiding unnecessary costs and efforts via an association that needs to be established, taken care for and paid for (decreasing money available for

incentives). Thus, the main aim to establish a regional system, based on voluntary engagement, could only be partly achieved, as due to the short notice exit of the interested private company for the pilot testing in Fuchstal, a simplified version of the Future Forest Fonds needed to be implemented. However, a concrete guidance on how to establish this association was provided for other municipalities that would like to establish the Future Forest Funds and where private companies and privates are willing to valorize ESS (to be found in the handbook on sustainable forest management (see Action E.2)).

During the project, a remuneration system was developed for private forest owners operating within drinking water protection areas. A proposal outlining compensation for the additional costs incurred by private forest owners who prioritize drinking water production over timber harvesting was discussed with the relevant drinking water suppliers. However, with the upcoming elections in Bavaria, none of the suppliers were willing to address such a politically sensitive topic as increasing costs for consumers, leading to only vague interest. As a result, the team was unable to successfully implement a payment system for forest owners in this work package. Despite this, other municipalities and the BioMineralwasser e.V. association are highly interested in in lively exchange with the project team during implementation and after project´s end to implement the elaborated system. Furthermore, the project successfully secured another very important simplified replication concerning the water premium in 2025. The initiative is being carried out in Brandenburg, in the north-east of Germany. The company Dohrn & Timm has agreed to pay a water premium to forest owners near its plant. The funds will enable the forests to be converted according to the silvicultural principles of LIFE Future Forest, which will result in an additional 50 liters per m² per year of leachate. This means that for 50 hectares, 25 million liters more water will flow into the groundwater. The ultimate goal is for more water to be added to the groundwater than is extracted by the company (more information, see Action B.3).

Spending targets: Budget shifts towards personnel costs, Travel and other direct costs & lower spending in EA for StadtL

Please find more info in Chapter 8 on Comments on the financial report.

List the main deliverables & milestones not completed as foreseen in the Grant Agreement

List the main deliverables & milestones not completed as foreseen in the Grant Agreement	**Please assess the extent to which these problems will affect interdependent actions and the timely completion of the project**	**Describe the measures taken or foreseen to overcome or alleviate the problems in question.**
Delays / Postponing:		
Laymen´s report – Flyer (Action D.1)	No effect	The deliverable was set for 02/2022, however, the laymen´s report can only be due towards the end of the project. The team designed a small

		flyer for project information on due date and elaborated an additional laymen's report at project´s end. These laymen´s report is the short English version of the handbook (E2)
Pilot test report: CO_2 storage and regional emission trading (Action B.3)	Implementation only in a simplified way	Due to the short notice dropout of the company paying the incentives, the municipality of Fuchstal took over the tasks and thus implemented the direct payment for the forest owners, making the planned Future Forest Fund association unnecessary (see also Action B3).
Pilot test report: Water works´ incentive scheme for sustainable forest (Action B.3)	Implementation only theoretically / simplified replication in Northern Germany	Due to missing political support, the implementation could not take place. However, the incentives were calculated after an on-site assessment of forest areas in Schwabhausen/Weil) and outside the county, in Brandenburg, the company Dohrn & Timm has agreed to pay a water premium to forest owners near its plant (see also Action B3).
Exploitation plan (Action E.2)	No effect	For better overview and to avoid doubling of work, the exploitation plan (Del) was integrated into the AfterLIFE plan (Del).

Table 1: List of main deliverables and milestones not completed as foreseen in the Grant Agreement

6.4 Evaluation of Project Implementation

Please evaluate the following aspects of the project:

- Methodology applied: discuss the successes and failures of the methodology applied, the results of the actions conducted and the cost-efficiency of actions.
- Compare the results achieved against the objectives and expected results foreseen in the proposal and described in section 4: clearly assess whether the objectives were met and describe the successes and lessons learned. This could be presented in a table, which compares through quantitative and qualitative information the actions implemented in the frame of the project with the objectives and expected results in the revised proposal:

Action	Foreseen in the revised proposal	Achieved	Evaluation
	Objectives: Expected results:		

- Indicate which project results have been immediately visible and which results will only become apparent after a certain time period.
- If relevant, clearly indicate how a project amendment led to the results achieved and what would have been different if the amendment had not been agreed upon.
- Describe the results of the replication efforts.

- Indicate the effectiveness of the dissemination activities and comment on any major drawbacks.
- Policy impact
    - Describe project achievements which supported legislation (regional, national, EU)
    - Indicate the main barriers identified and the action(s) undertaken to overcome them
    - Describe any policy developments that resulted from your project activities
    - Describe how the project delivered the results foreseen in the Grant Agreement form B3 "EU ADDED VALUE OF THE PROJECT AND ITS ACTIONS". In addition, if in the Grant Agreement Form B1, the project has been labelled as significantly climate related and/or biodiversity related, cover these elements as well.

Evaluation of the methodology applied

Please find the Evaluation of the methodology applied integrated in section 6.1 – Technical progress per action.

Comparison of the results achieved against the objectives and expected results foreseen in the proposal

This table can also be found with the different actions in Chapter 6.1 – Technical progress per action. Please find an aggregation here:

Action	Foreseen in the revised proposal	Achieved	Evaluation
A1: Scoping exercise on knowledge base and set up of continuous working structure	Objectives: • Knowledge base for information exchange • Involvement of stakeholders Expected results: • Database of existing knowledge • Informal cooperation concept on inter-municipal level • Round table meetings	• Knowledge base for information exchange	• An open access version of the knowledge base will keep the collection alive throughout the end of the project
Action	Foreseen in the revised proposal	Achieved	Evaluation
A2: Update of a work plan and development of a baseline scenario 2050	Objectives: • Development of a baseline scenario 2050 for the reference areas	• Baseline scenario 2050 • Updated work plan • Collection of methods for calculating above-	• Timeline of workplan adaption necessary

	• Integrated Scan of the baseline status and necessary steps to start work Expected results: • Baseline Scenario 2050 report • Updated work plan • Methodological elaboration for carbon storage and valorisation • Acquisition of a consultant for the assistance in the coordination of the project	/underground carbon storage per tree species • Initial discussions about future valorisation systems led to first structures (for Action B.3) • Acquisition of an external consultant for project assistance	• Methods for analysing CO_2 storage potential easy to reapply. • Difficult to verify accuracy of generated data • Valorisation not only for single ESS.
Action	Foreseen in the revised proposal	Achieved	Evaluation
B1: Creation of an instrument for regional self-assessment including a replicable legal framework	Objectives: • legal framework package • evaluation of existing evaluation methods for counties and communities in Germany • creation of a replicable self-assessment for regional and local use by municipalities Expected results: • Self-assessment tool for municipalities • Legal framework assessment methodology • Part 2 of handbook • Finalised assessment	• Legal Framework package • Search for existing evaluation methods for counties and municipalities in Bavaria • creation and implementation of a self-assessment for regional and local use by municipalities • creation of a digital version of the self-assessment (using as an App) Handbook, Part 2	A pilot project could only be initiated in Fuchstal. A remuneration system is to follow in the municipality of Scheuring, which is being developed in cooperation with HSWT. The results of the soil and forest event week in March 2024 gave impetus to a forest water premium
Action	Foreseen in the revised proposal	Achieved	Evaluation
B2: Demonstration of afforestation and maintenance	Objectives: • Detailed planning and preparation • Demonstration of afforestation for forest conversion	• In total 403 ha were planned for afforestation and maintenance • Handbook Part 3	The backlog in planting at the start of the project has been completely made up.

measures for sustainable forests and soils	• Demonstration of maintenance measures for sustainable forest (and soil) management Expected results: • Part 3 of the handbook • Detailed plan and photo documentary of afforestation and maintenance measures • Detailed roadmap for Action B2 • Diary of round table discussion content	• Afforestation and maintenance were demonstrated, in total on 403 ha • All measure devices are installed for monitoring, incl. documentation of the various research measures • Planting of 66.904 trees Diary or round table content	As expected, the measuring devices are of high quality and can continue to be operated in the long term. Utilisation and maintenance of the measuring devices is ensured in the long term.
Action	Foreseen in the revised proposal	Achieved	Evaluation
B3: Valorisation system for municipal ecosystem services and modelling of the integration of the results into political decision-making	Objectives: • system for voluntary trading of regional certificates for CO_2 emission • quality and availability of drinking water provided by sustainable forests connected to regional water price via incentive system Expected results: • Draft on valorisation systems • Part 4 of handbook • Pilot test report: Water works' incentive scheme for sustainable forest • Draft on valorisation system • Pilot test report: CO_2 storage and regional emission trading • framework with the federal representatives of the national emission trading system	• Part 4 of the handbook • Pilot test drive on FutureForest Premium and report • Implementation of FutureForest Premium for five years in community of Fuchstal • Pilot test drive on self-Assessment for water incentive and report • Exchange with the federal representatives of the national emission trading system	• an association for the organizational work of the FutureForestFund is missing (simnplified implementation of Future Forst Fonds implemented in Fuchstal) • official certification of premiums is missing • with drinking water supplier unwilling to implement premium, Project team is unable to get further success, however first steps are taken to implement the system

			outside of the county.
Action	Foreseen in the revised proposal	Achieved	Evaluation
C1: KPI measurement and project monitoring	Objectives: • monitoring of all LIFE FutureForest actions • analysis of the socioeconomic effects Expected results: • List of KPIs and respective monitoring tools • Final report on KPIs • Socioeconomic analysis • Life cycle assessment	• Measure devices monitored the environmental aspects (Action B.2 and C.1). • Project communication was monitored constantly, showing an active and successful communication and awareness raising (see also Actions D) • Final report on KPIs • Socioeconomic analysis • Life cycle assessment	Almost all KPIs could be reached, for communication indicators, the project team could highly overachieve the expected numbers.
Action	Foreseen in the revised proposal	Achieved	Evaluation
D1: Project communication	Objectives: • Regular public relation work • Laymen's report •	• Public relation work was highly successful, target values were exceeded highly • A Laymen's report in English has been created and published	The public relation work was outstanding. The Laymen's report was successfully published
Action	Foreseen in the revised proposal	Achieved	Evaluation
D2: Citizen information at county level	Objectives: • Two county wide events • Annual "soil and forest event weeks" Expected results: • 2 annual "sustainable forest event days" • Take up and further development of initiatives that support the forest transformation • Regular report from the round table discussions and the project progress in the regular information updates	• The two county wide events were successfully done and extended to a third one: A Multi Geocache in Kaufering • Every year in March and September, a soil and forest event week has been carried out, eight in total. • Information about the latest round tables has been published on the website	The project was very successful in carrying out the D2 actions and exceeded what was asked for in the project proposal

	on climate action in the county area Integration of official networking partners into the information loop and active invitation to participate in the project progress	• Official networking partners have been integrated to participate in the projects progress • An image film has been made and published	
Action	Foreseen in the revised proposal	Achieved	Evaluation
D3: Integration into an EU wide replicability system and connection to policy networks	Objectives: • dissemination of project results and impacts • Active push for replication on county area • Active communication and engagement with policy networks • Active participation in the Green Week • Network with other universities Expected results: • 1 visit at the GreenWeek in Brussels • 1 Information event on county level with participation of representatives of large networks • EU replicability integration and policy network connection roadmap • 1 concept for a phd or master thesis • 2 visits to relevant policy network working groups • Sustainability strategy	An information event on county level has been carried out • The project team visited the GreenWeek conference in Brussels, had a presentation with DG-ENV and met Ms. Ulrike Müller (MEP) • An EU replicability integration and policy network connection roadmap was developed • A concept for a phd or master thesis was submitted • 2 visits to relevant policy network working groups have been done • A sustainability strategy has been made •	• The project team did very well in communicating their project and networking with large networks. • Policy network groups have been visited and well informed about the project • The project was able to achieve a great deal with little financial input and worked efficiently
Action	Foreseen in the revised proposal	Achieved	Evaluation
E1: project management	Objectives: • Set-up of management activities and update of work plan with regards to administrative procedures • Project secretariat and hotline • Internal communication	• Project secretariat • Decision-making, Reporting, financial management, controlling and monitoring • Diary of co-ordination meetings back-to-back	The project management structures supported the progress of the project implementation

	• Project co-ordination and decision-making and reporting • Financial management and controlling • Project monitoring Expected results: • financial and technical project reports • Diary of co-ordination meetings back-to-back with round table meetings • 2x3 individual controlling report for the partners • Extraction of project data from the KPI webtool	with round table meetings • Individual controlling reports for PP • Inserting of final KPI values into KPI webtool	and monitored the implementation process and spending on partner and project level. .
Action	Foreseen in the revised proposal	Achieved	Evaluation
E2: After LIFE: Long term communi-cation and replication plan	Objectives: • long-term sustainability of project activities and results Expected results: • After-LIFE plan • Finalised handbook for sustainable forestry • Replication plan • Exploitation plan	• Several replications of B2 already starting • AfterLIFE plan, incl. exploitation plan • Handbook for sustainable forestry Replication plan	The handbook (long and short versions (Laymen´s report) received very positive feedback and was requested from our stakeholders. The AfterLIFE plan will ensure long-term sustainability of the results (e.g. handbook, self-assessment app, valorisation systems)

Table 2: Comparison of the results achieved against the objectives and expected results foreseen in the proposal – aggregated table

Visibility

Indicate which project results have been immediately visible and which results will only become apparent after a certain time period.

Immediate visible results:

- Afforestation and maintenance measures: During the project period, on 403 hectares of forest, maintenance measures took place, and 66.904 trees had been planted across public and private forests. These plantings involved a mix of 75 percent deciduous and 15 percent coniferous trees. These activities were visible shortly after their implementation, demonstrating the project's capacity to mobilize and act rapidly.
- Soil and biodiversity measurements: Analyses of soil health and biodiversity were conducted during a total of nine "Soil and Forest Event Weeks". These assessments provided immediate insights into the ecological health of the areas being managed, with measurements of fine root growth and earthworm populations being particularly telling.
- Involvement of non-governmental organisations (NGOs) and other stakeholders in project activities: The project successfully engaged 9 entities from regional, national and international organizations, building immediate awareness around the importance of sustainable forest management. These efforts contributed to public understanding and political support early in the project. The press also took up the subject in many cases. Newspaper, radio, and television reports appeared. The number of reports achieved within the project is considerable. It was and is clearly noticeable that both the press and the public are very open to the topic and are happy to deal with it.

Long-Term visible results:

- CO_2 sequestration and water quality: While the initial measurements provided a baseline, the long-term benefits of CO_2 sequestration and improvements in water filtration will only become fully visible after a more extended period. The project anticipates that mixed forests will contribute to long-term carbon storage and improved nitrate reduction in water sources, leading to better drinking water quality and higher quantity due to higher water saving capacity of living soils and dee roots.
- Soil health and forest resilience: The project expects that improvements in soil health, particularly through increased biodiversity, humus structure, and water retention, will take time to manifest. These benefits are tied to the long-term resilience of mixed forests against climate change impacts, including pest infestations and extreme weather.
- Economic and social impacts: The long-term economic impacts, such as the monetization of ecosystem services via emission certificates and forest premiums, are designed to provide sustainable income to forest owners. However, these financial benefits are expected to grow more evident over time. Policies and markets need to adapt to the project's and similar ecosystem services valuation models in general in order to support the conversion of forests into sustainable ones.

<u>Project amendment</u>

clearly indicate how a project amendment led to the results achieved and what would have been different if the amendment had not been agreed upon.

The project received the approval for a project prolongation of 6 months leading to a new project end date on 30.6.2024. This prolongation was necessary to ensure the completion of the project which showed a delay already after one year of project implementation (see Progress report I and Mid Term Report).

Replication efforts

Describe the results of the replication efforts.

When it comes to sustainable forest management, the replication efforts of the LIFE Future Forest project have shown significant progress, with a strong potential for broader application at both national and international levels. These achievements are a result of strategic partnerships, the development of scalable tools, and the active involvement of private forest owners as well as regional institutions:

- A key aspect of the replication strategy was providing accessible and user-friendly tools for private forest owners across Germany. Through the introduction of the Self-Assessment App and a practical handbook, forest owners can independently apply sustainable forest management practices. These tools also enable forest owners to approach municipalities regarding possible premiums for providing ecosystem services. Initial feedback has been positive, with many owners already starting to implement the methods in their forests.
- The Dauerwaldakademie (English: Academy for permanent forests) is currently established, where the Future Forest methods are applied and trained. More info to be found under Action E.2.
- An example for a future replication on sustainable forest management and both the Future Forest Fonds and the Forest water premium is the municipality of Neunburg im Wald, where further efforts are planned for 2025, including specific measurements and evaluations through two bachelor's theses. This groundwork will serve as the basis for implementing the Future Forest Fund and potentially the Forest water premium. Such pilot projects demonstrate the practical applicability of the Future Forest methods.
- An example of a simplified replication for the water premium starts 2025 in Brandenburg, where the company Dohrn & Timm has agreed to pay a water premium to forest owners near its plant. The funds will enable the forests to be converted according to the silvicultural principles of LIFE Future Forest, which will result in an additional 50 liters per m² per year of leachate. It follows the ultimate goal of more water being added to the groundwater than being extracted by the company.
- Collaboration with key stakeholders also after the end of the project lifetime, such as the Community of Interest for Healthy Soil (IG Gesunder Boden), Building agriculture (Aufbauende Landwirtschaft), Art and Nature foundation, Organic farmers in Germany, (Chairman Sepp Braun), Stefan Schwarzer (in the field of land use and water), and organizations/companies like Positerra and Allgäu Holzforum, Baufritz, continues to strengthen replication efforts. These partnerships allow for broader awareness raising, capacity building and replications.

The results of the LIFE Future Forest replication efforts, especially on sustainable forest management, are promising, laying a solid foundation for broader application. By combining user-friendly tools, strong institutional support, financial backing, and successful pilot projects in other regions, the forest management replication of the project is being advanced at the national level. These measures ensure that the sustainable forestry practices promoted by Future Forest can be adopted not only locally but also regionally and internationally, delivering long-term ecological and socio-economic benefits. Please find more detailed information in the Replication plan (Deliverable "Action.E.2_Replication plan")

Effectiveness of the dissemination

Indicate the effectiveness of the dissemination activities and comment on any major drawbacks.

The project's public relations activities were already very numerous and varied in the first half of the project. Events, training courses, round tables and forest walks, as well as podcasts, TV and YouTube contributions, continued to take place. In this way, the project was able to cover a wide range of target groups and was always a talking point due to the high number of activities. The local press in particular, but also occasionally larger media (e.g. Tagesschau.de) outside the district, picked up on the topic and the project. Forester Ludwig Pertl in particular was able to use his large network and succeeded in gaining important supporters who also have decision-making power in their area. The impact of this work will continue to be seen in the future if the silvicultural objectives and, ideally, the premium models are increasingly accepted and disseminated. This will happen first and foremost through the people who have been convinced by the project and are striving for local implementation in their respective countries.

Below, some activities are listed as examples in the context of presentations of the project at other events:

In March 2022 at a project presentation on Zoom as part of the annual shooting planning of hunters in the district, around 100 hunters were informed about the project. During this event, project manager Nikolaus Storz emphasized the importance of adhering to the shooting figures for forest conversion. Ludwig Pertl also presented the project at a hunting meeting in Kaufering in the same year in order to reach the target group of hunters.

The project team has tried to find one or more private companies for the Future Forest premium that would like to contribute money to the FutureForestFonds. Examples include the business meeting at Dimi in Kaufering in June 2022, the meeting with Hilti, the Sparkasse (bank) and Hirschvogel. The latter has signalled to the project team for months that they would like to participate in the payment of the future forest premium. In the end, Hirschvogel withdrew four days before the decisive event and left the project team in the lurch. The team then learned not to rely on verbal statements, but to always obtain signatures on official documents beforehand. The other companies were all only interested in official CO_2 certification files.

The project team took part in several scientific conferences, including the “Agrosym” symposium in Bosnia with around 300 participants, presentations at the Soil Days of the Healthy Soil Interest Group and the Future Forest project conference in September 2023.

Of course, numerous forest tours continued to take place, each with different objectives and target groups. For example, Sebastian Hauk personally presented the app application during the forest walk at the project's final conference. Overall, the forest walks were very numerous and very popular, as the topics could be explained directly in the forest (in a practical way).

Young adults were also addressed in some of the activities, such as during the exhibition in the Landsberg am Lech district administration office “Forest: an all-rounder”. Three school classes visited the exhibition and were given a guided tour. A ninth-grade class in Kaufering also received a personal presentation from the project manager and had the opportunity to discuss with him. The children were also reached specifically at the child safety day in Kaufering.

The mayors were mainly kept informed through the regular round tables, but also in a mayors' meeting in March 2023 with 31 participants. At this meeting, they were updated and were able to provide feedback.
Although private individuals usually have no decision-making power in the forest, they were nevertheless regularly informed. This happened, for example, at the very large event of the so-called “Spring Festival”, an event organized by the Art & Nature Foundation. Around 400 people were present and project manager Nikolaus Storz was represented with a stand. Other effective campaigns to reach various private individuals were Earth Day (approx. 150 participants), the Children's Safety Day in Kaufering (approx. 70 participants at the stand, also adults present) and N. Storz's lecture to approx. 60 people as part of the Art & Nature Foundation's “Forest Transformations” event.
Newspapers were regularly provided with information, including the local newspaper “Landsberger Tagblatt”, the Landsberger Tagblatt Extra, the Kreisbote and the regularly published magazine “mein Landkreis”. There was constant positive reporting about the project and information about the latest events.
Networking with other projects took place, for example, at the Zoom meeting with Dr Andreas W. Bitter or a meeting with the LIFE project “Climate Forest”.
Various influential networks were reached. A meeting was held with the Association of German Foresters (BDF) and the associated “Ecosystem Services” working group. The BDF took the side of the project relatively quickly after the initial contacts and disseminated it via its own channels. Since then, the BDF has called for every German university with a connection to forestry to provide its own practical example along the lines of Future Forest and published a position paper in line with the project. Other important network partners such as the EUSALP Working Group 6 and the German Aerospace Centre (DLR) were informed through presentations. The DLR is attempting to support sustainable forest management in the future by developing scientific methods for evaluating forests using satellite images. Furthermore, the interest group (IG) Healthy Soil was able to achieve excellent public relations work. Ludwig Pertl has been a member of this group for a long time and was promoted to head of the forestry department. He contributed several presentations at the annual soil conferences.
The complete list of over 200 public relations activities can be found in the supportive documents (“Action D.1-3_Public_relations_list_Future_Forest”). The list shows that the project team developed enormous potential within the project duration, was able to record numerous and diverse actions and reach an extraordinarily large number of people. The project's public relations work thus achieved an extraordinary reach and resonance, which is rare on this scale.

<u>Policy impact</u>
Describe project achievements which supported legislation (regional, national, EU)
Indicate the main barriers identified and the action(s) undertaken to overcome them
Describe any policy developments that resulted from your project activities
Describe how the project delivered the results foreseen in the Grant Agreement form B3 “EU ADDED VALUE OF THE PROJECT AND ITS ACTIONS”. In addition, if in the Grant Agreement Form B1, the project has been labelled as significantly climate related and/or biodiversity related, cover these elements as well.

The LIFE Future Forest project has contributed significantly to policy discussions and developments at various levels. At the regional level, the project fostered collaboration with policymakers, exemplified by the engagement with Ulrike Müller (member of the federal state parliament of Bavaria) and for national level with the Bund Deutscher Fortuiti (BDF, English Association of German foresters). These interactions supported the integration of sustainable forest management practices into local and - hopefully in the future - national policy frameworks. A concrete example is the potential implementation of the forest water premium in Neunburg vorm Wald, which, if enacted, will be aligned with the Future Forest concept, emphasizing ecosystem services and sustainable forest management.
However, several barriers were identified during the project's implementation. A key challenge was the resistance from local water authorities and municipal stakeholders, which prevented the full execution of the water-related elements of the project. This highlighted the need for stronger political backing in future initiatives. The lack of official recognition for the project's ecosystem service certificates also limited the involvement of private companies, as participation remained voluntary without clear legislative support.
Furthermore, a significant policy gap exists, as current legislation tends to focus on

- disaster recovery rather than proactive measures for building resilience and preventing future crises
- forests as CO_2 sequestrator or timber produce instead of ecosystem service provider or soil relevant.
- The governmental union of nature conservation and environmentalists opposes the project's sustainable forest management approach, favouring outdated practices from the 1950s rather than addressing current climate change challenges.

Despite these obstacles, the project delivered key results foreseen in the Grant Agreement form B3 by contributing significantly to EU policies on Sustainable Forest Management, climate resilience, and biodiversity conservation. The project's emphasis on ecosystem restoration and climate resilience aligned well with the EU's broader environmental objectives.

- The project supported the EU's Sustainable Forest Management concept by promoting long-term sustainable practices, replacing spruce monocultures with diverse, climate-resilient mixed forests. It aimed to bridge the implementation gap at the local level by demonstrating a win-win scenario—balancing ecological benefits with economic cycles. The development of a regional certificate system to valorise ecosystem services, such as water filtration and CO_2 sequestration, underscored its contribution to the EU's green economy goals.
- As a climate-related project, LIFE Future Forest addressed the vulnerabilities of spruce forests due to rising temperatures. The project promoted mixed-forest management to enhance water retention and cooling effects. By focusing on fine root systems and CO_2 storage, alongside earthworm populations, the project integrated soil health into climate adaptation efforts, advancing the EU's climate goals.
- The project highlighted the connection between soil health and biodiversity, focusing on earthworms as bioindicators of ecosystem health. By demonstrating the repopulation of earthworms in sustainably managed forests, the project supported soil and aboveground biodiversity, ensuring long-term ecosystem resilience. This contributed to the EU's biodiversity targets by reinforcing the importance of maintaining diverse and healthy forests.

Regarding the connection to EU wide policy networks, the project participates in the Alpine Soil Partnership, a highly relevant network partner with important contacts to EUSALP AG6, Global Soil Partnership, the Alpine Convention, etc. Within the project lifetime, the project was presented at an EUSALP AG6 meeting, an Alpine convention Soil working group meeting, and an event day of the Alpine Soil Partnership (online) leading to interesting discussion and positive feedback on the project´s work and aims. Furthermore, the EU Mission Soil requested the project to present their work during the EU mission soil week in Madrid (2023) which led to another invitation to present the project at the panel of the forum for the future of agriculture (organized by the Future Forest Initiative and the European Landowner Association in 2024). The interest in the project on EU level can thus clearly be shown.

In summary, while the LIFE Future Forest project made important strides in influencing policy, particularly at the regional level, and contributing to EU policy, the experience underscored the need for greater political support and formal recognition of ecosystem services in future policy frameworks.

6.5 Analysis of benefits

In this section, please discuss the project's progress focusing on the results achieved. Justify any anticipated significant deviations from the targets set initially, and comment on targets already met or exceeded. In the case of the Final report, where relevant, refer to the final actual values of the Key Project-level Indicators (KPIs).:

1. Environmental benefits
    a. Direct / quantitative environmental benefits:
        i. LIFE Environment & Resource Efficiency: e.g., reductions of emissions, energy, or resource savings.
    b. Qualitative environmental benefits
        i. LIFE Environment & Resource Efficiency: e.g., long term sustainable technology, from product to functional focus, from end-of-pipe to prevention; high visibility for environmental problems and/or solutions; spin-off effect in other environmental areas etc.

a. Quantitative environmental impacts

The LIFE Future Forest project delivered significant quantitative environmental benefits during its implementation, covering key areas such as sustainable forest management, ecosystem restoration, and climate adaptation. However, it needs to be stated that, due to the nature of the project working on the improvement and sustainabilisation of forest and soils, some of the expected results (no. 3 – 5) can only show evidence in future decades. The time needed for full development and growth of planted trees and thus the improvement of soil, higher amount of earthworms, and CO_2 storage capacity overcomes a possible project lifetime by far. However, the seeds needed for those results were planted in the project lifetime and experiences from former times allow calculations to estimate the expected changes in future decades initiated by LIFE Future Forest.

1) Expected result: Increase of the area with continuous sustainable forest management through appropriate maintenance measures in the county by 450 ha*

a. Achieved: By the project's conclusion, the implementation of continuous sustainable forest management was strengthened across 403 hectares, thus ensuring a significant increase in the area under continuous sustainable management. This expansion was achieved by integrating:
    i. Previously piloted areas, which had undergone limited-scale sustainable practices in the past, were systematically assessed, expanded, and incorporated into a structured sustainable forest management framework after LIFE Future Forest (including maintenance and additional afforestation).
    ii. Newly reforested sections (e.g., former old-growth spruce stands) were actively managed and enhanced, ensuring their integration into the overall sustainable forest system after LIFE Future Forest.

   Although the numerical target of 450 hectares was not fully reached, the project substantially fulfilled the intended goal by demonstrating a scalable and replicable approach to sustainable forest management in the county. The implemented measures followed the Dauerwald concept, promoting continuous mixed-forest management, species diversity, and the planting of tree species beneficial for soil life, such as those supporting earthworm populations. These interventions ensured that natural and climate-stable permanent forest principles were effectively applied, contributing meaningfully to long-term forest resilience and conservation (see also Action B.2).

b. Details: The 403 hectares consist of 56,21 ha owned by the City of Landsberg (incl. Maintenance measures and planting) + 242,42 ha of municipal forest areas + 104,43 ha owned by private foresters.

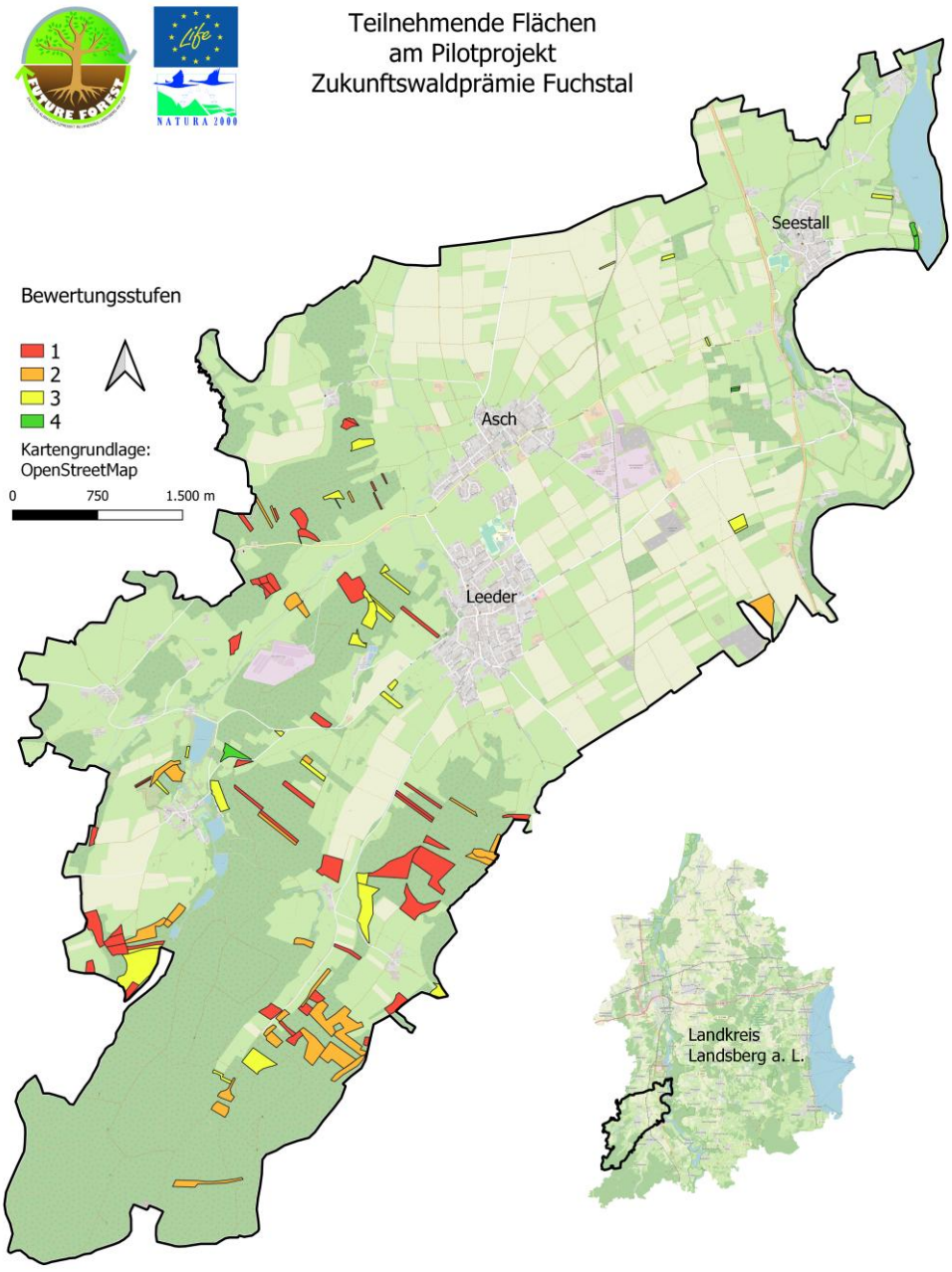
   *for this expected result, please also see the detailed information provided in Action B.2 (p26)

2) Expected result: Increase of the area made available for future sustainable forest management measures by 50 ha

a. Achieved: Within the implementation of the simplified Future Forest Fonds in Fuchstal (see Action B.3), a total of 56 ha of forest which is currently classified as Level 1 (not sustainably managed yet) was made available for sustainable forest management measures. The different forest owners signed a contract with the LIFE Future Forest project and the municipality of Fuchstal that they will receive funding from the municipality if their forest areas increase in the level of sustainable forest management (new evaluation after 5 years).

b. Details: A total of 120 hectares with 118 individual areas took part in the pilot project in Fuchstal. 56 hectares were classified in level 1 and have the greatest potential in terms of development into permanent forest structures. 32 hectares were classified level 2, 30 hectares were classified level 3 and only around 2 hectares were able to be classified level 4 and high-quality permanent mixed forest structures. Attached you find a map showing the participating areas.

Figure 28: Overview on participating areas for the Future Forest Fonds in the municipality of Fuchstal, own map



3) Expected result: Increase of the amount of fine roots for improved CO_2 storage capacity in the demonstration area by 24 tons/ha

    a. To be achieved: The project measured that, on average, the sustainable managed forests sequestered 4,360 kg of CO_2 per hectare annually, contributing to climate mitigation efforts. Thus, in the future, when the newly planted trees develop their fine roots and improve CO_2 storage, the efforts of the project can lead to significant improvements in carbon sequestration.

    b. Calculation: Data on the compartments was collected during the soil and forest event weeks. In this way, the annual growth rate of trunk wood, bark, branches, leaves, rhizomes and fine roots could be calculated for different tree

species. The annual CO_2 storage was determined from this. Based on the research facility and the percentage tree species distribution, the average CO_2 storage can be approximately calculated for the area.

4) Expected result: Increase of the amount of earthworms in the demonstration areas as indicators for improved aeriation and biodiversity by at least 20 per square meter in the newly converted areas.

    a. To be achieved: The earthworm population, especially in softwoods, is around 6 individuals per square meter. However, precious hardwoods reach around 150 pieces per square meter. After the proportion of softwoods continues to decline through forest conversion and precious hardwoods are increasingly promoted, at least 80 individuals per square meter will live in good mixed forests with a tree species proportion of softwoods 20%, deciduous 40% and noble deciduous 40%. For the 403 ha of private and communal forest of the partners in the district, it can be said that at the end of the project period, the LIFE Future Forest project laid the basis to reach the average number of earthworms was 66.5 per m² in the future on the project area.

    b. Calculation: During the soil and forest event weeks in the project and from the Interreg Alpine Space project Links4Soils, numerous studies were carried out on earthworm populations under different tree species. The results were extrapolated based on the tree species distribution of the forestry facility. While in 1980 there were around 34 earthworms per square meter, the forests with good mixed forests (see above) showed around 80 individuals per square meter. In 2024, at the end of the project, according to the forestry department, the tree species distribution was 46% coniferous wood, 23% deciduous wood and 31% hardwood. Based on this distribution, an average earthworm population of 66.5 per square meter results. This equates to a population of around 270 million for 403 hectares.

5) Expected result: Increase of the number of inhabitants with improved quality of life through better improved water retention, cooling and soil quality.

    a. To be achieved: The project monitored humidity and temperature changes to quantify the cooling effects of forests. On average, permanent forests reduced temperatures by 4°C compared to coniferous forest, with maximum cooling effects of up to 10°C observed in forested regions on hot days compared to urban areas. Therefore, in the future, the sustainably managed forest will improve the microclimate regulation and thus the quality of life for Landsberg´s inhabitants.

    b. Evidence: Temperatures were measured at different locations using various measuring devices. An exemplary hot day study shows that forests have peak temperatures that are up to 10°C lower than urban areas. But clear differences have also become apparent between different forest types. While coniferous forests are only 6°C cooler, mixed forests are 10°C cooler. Forest conversion to permanent mixed forests can cool the local climate by 4°C more.

These results, of which some are / will only show in the future due to the project working on forest and soil changes, demonstrate the environmental impacts the LIFE Future Forest

project provides and will provide to the area in the future years, highlighting its success in promoting sustainable forest management, improving ecosystem health, and mitigating the effects of climate change.

b. Qualitative long-term environmental Impacts

- Diversification of tree species will create a variety of habitats, promote biodiversity, and strengthen above-ground resilience to pest infestation or extreme weather.
- Permanent mixed forests will lead to significant soil improvements in the long term (humus structure, permanent humus, living soil, long-term and more underground CO_2 storage, better water filtering, nitrate reduction, and thus better drinking water).
- Improved humus structures and fine root systems, along with increased biodiversity through species diversification, will enhance the resilience of forests to climate change.
- Through continuous evaporation, deep-rooted tree species will make a significant contribution to cooling performance and thus to buffering heat waves.
- Enhanced water filtration and storage capacity in soils will positively impact drinking water quality, supporting sustainable water management within forested areas.
- Due to increased evaporation, regional water cycles can be closed or improved, which will generate sufficient precipitation during the growing season.
- Diverse permanent mixed forests in close proximity to villages will offer a high level of recreational and health benefits for the local population.

2. Economic benefits (e.g., cost savings and/or business opportunities with new technology etc., regional development, cost reductions or revenues in other sectors); state the number of full time equivalent (FTE) jobs created, showing a breakdown in qualified/non-qualified staff.

   The project developed a model for the valorization of ecosystem services, particularly through emission certificates and forest premiums. This approach offers forest owners financial compensation for focusing on ecosystem services like CO_2 sequestration and water filtration, instead of solely relying on timber sales.

   Currently, forests are economically undervalued because their utility is primarily seen in terms of timber sales. However, forests provide multiple ecosystem services such as CO_2 sequestration, cooling, and local recreation, which are often overlooked in traditional economic calculations. The true value of forests cannot be measured solely by the amount of timber sold. The LIFE Future Forest project aims to address this imbalance by developing an emission certificate system that monetizes these additional ecosystem services. Through this system, forest owners who prioritize sustainable forest management can receive financial compensation for ecosystem services like CO_2 sequestration and water filtration, rather than focusing solely on timber harvest, particularly spruce.

   During the project, this approach was successfully implemented in the municipality of Fuchstal, benefiting approximately 31 forest owners and resulting in annual funding of around €10,000.

Furthermore, the project created 3.6 full-time equivalent (FTE) jobs for qualified staff, focusing on the implementation of sustainable forest management practices and ecosystem service monitoring.

For other forest owners, economic benefits have been limited due to the impacts of climate change, which has led to a surplus of damaged timber, creating an oversupply in the market. Although timber prices briefly increased due to the war, they have since levelled off. LIFE Future Forest offers a sustainable model to counteract these challenges by creating long-term financial incentives tied to the preservation and enhancement of ecosystem services.

3. Social benefits (e.g., positive effects on employment, health, ethnic integration, equality, and other socio-economic impact etc.)

The societal impacts of the LIFE Future Forest project have been significant, largely due to the strong acceptance and support from regional policymakers, forest and landowners, citizens, and various organizations. The project has successfully communicated its relevance to approximately 2000 people across regional and national organizations, enhancing awareness about the value of sustainable forest management. While behavioural changes and concrete guidance for communities are still in development, the groundwork for these shifts is being laid through continuous outreach and education.

Ecosystem services provided by a sustainably managed forest offer significant social benefits to residents. These forests contribute to cleaner air and improved water quality through natural filtration, reducing pollutants and enhancing public health. Additionally, the cooling effects of tree cover help mitigate heat waves, creating more comfortable living conditions. Sustainable forests also offer recreational opportunities, such as hiking and nature walks, which promote physical and mental well-being. By preserving biodiversity and maintaining resilient ecosystems, these forests contribute to a healthier, more enjoyable environment for surrounding communities.

Furthermore, educational programs such as the "Soil and Forest Event Weeks" have involved university students in hands-on activities related to sustainable forest management. These events have not only provided practical knowledge but also helped cultivate a new generation of advocates for sustainable forestry practices.

Through such efforts, the LIFE Future Forest project is contributing to long-term social benefits by promoting environmental stewardship, fostering local involvement, and enhancing the public's understanding of the essential ecosystem services provided by forests.

4. Replicability, transferability, cooperation: Potential for technical and commercial application (transferability, economic feasibility - bankability, limiting factors, suitability for additional funding from other streams e.g. structural funds, EIB financial instruments, venture capitals, pension funds, responsible investors) including cost-effectiveness compared to other solutions, benefits for stakeholders, drivers and obstacles for transfer, market conditions, pressure from the public, potential degree

of geographical dispersion, specific target group information, high project visibility (eye-catchers), potential for replication in same and other sectors at the local and EU levels, etc.
State the project's likelihood of replication (high/low/zero), and if its replication is market-driven or policy-dependant. Specification of potential market/replication vehicles. Possibilities for complementarity with existing market players and/or other solutions/projects (bundling). Those projects who have completed the C2M checklist or engaged in the Close-2-Market (C2M) Initiative should elaborate here on all the relevant C2M aspects. Those projects should also complete, by the Final Report submission stage, the final C2M checklist provided to them by the C2M experts.

The LIFE Future Forest project demonstrates a high likelihood of replication due to its innovative approach, combining both market-driven and policy-driven strategies. As climate change continues to reduce the viability of spruce, the need for species diversification becomes clear from both an environmental and economic perspective. The market-driven project replicability is enhanced by the development of practical tools, including the Self-Assessment Tool and an easy-to-apply handbook, which provide step-by-step guidance for municipalities, forest owners, and regions to adopt sustainable forest management methods.
To facilitate broader application, the project is embedded in key networks such as the Alpine Soil Partnership and EUSALP, fostering political support and driving replication beyond the local region. Political decision-makers and partnerships with private entities, such as the foundation Art and Nature, have further demonstrated the project's growing acceptance and adaptability.
Policy-driven replication, while more challenging, holds the potential for broader regional influence. Systems that valorise ecosystem services, as shown in the Future Forest project, require stronger political backing but could offer transformative benefits. The Dauerwaldakademie and prestigious environmental supporters enhance the project's political prospects. Additionally, soil monitoring instruments and partnerships with the BDF (Association of German Foresters) and other initiatives and companies (e.g. Baufritz) further support replication efforts.
With strong local, national, political, and private partnerships, the LIFE Future Forest project is well-positioned for replication across Germany and beyond, driving broad-scale environmental and economic impacts.

5. Best Practice lessons: briefly describe the best practice measures used and if any changes in the strategy employed could lead to possible adjustment of the best practices.

- Comprehensive Ecosystem Services: One key best practice from the Future Forest project was the integration of multiple ecosystem services into the valuation model, rather than focusing solely on CO_2 sequestration. By combining CO_2 sequestration with other services such as water filtration, cooling, and biodiversity, the project was able to provide a more comprehensive and accurate representation of the forest’s value. This strategy attracted a wider range of stakeholders and highlighted the project's long-term environmental and economic benefits.

- Use of Advanced Technology: The project employed advanced technologies via measuring instruments, to evaluate forest conditions and ecosystem services. These tools not only made data collection more efficient but also provided forest owners with concrete data on the health and value of their forests.
- Strong Political and Community Involvement: The success of the Future Forest project relied heavily on strong partnerships with local and regional political figures, as well as community engagement. Active dissemination through networks such as the Alpine Soil Partnership and political support from the Alpine Convention were critical in promoting sustainable forest management practices. This approach helped build a solid foundation for policy change and replication.
- Scalable Tools for Replication: The development of a self-assessment app and handbook for forest owners allowed for easy replication of the project's best practices. These tools provided clear guidelines for sustainable forest management, making it accessible for municipalities and private owners alike.

The adjustments to the strategy, by simplifying the self-assessment tool via integrating it into an easy-to-apply app and providing more training, will enhance its usage and spread.

6. Innovation and demonstration value: Describe the level of innovation, demonstration value added by EU funding at the national and international levels (including technology, processes, methods & tools, nature management methods, models for stakeholder involvement, land stewardship models, organisational & c o-operational aspects).

The LIFE Future Forest project showcases significant innovation and demonstration value, particularly through its integration of advanced technologies, ecological models, and new methods for stakeholder involvement. The project received substantial support from EU funding, which enabled various measurements that confirm hypotheses rarely discussed in mainstream science. These include assessments of the impact of permanent forests on water quality, carbon sequestration, and soil health. Measurements of nitrate levels in the water revealed lower values in permanent forests, demonstrating the benefits of sustainable forest management for water filtration and availability. This has led to the conclusion that such forests provide more and better-quality water, depending on the soil type.

The method of debarking head usage is innovative. It aims at leaving nutrients in the forest ecosystem by reducing the removal of biomass during logging. This practice has shown promise in maintaining the nutrient cycle within forest ecosystems, which is critical for long-term sustainability.

Furthermore, the exchange with key figures, such as Stefan Schwarzer, emphasized the need to connect CO_2 sequestration, water management, and soil vitality into a unified model for land stewardship. This holistic approach strengthens the case for more sustainable, resilient forestry practices that can adapt to climate change.

Through its cooperation with other initiatives like IG Gesunder Boden (Interest group healthy soil), the project was able to involve leading experts in fields such as living soils, water management, and forestry. Additionally, EU funding gave the ability to explore complex and multi-faceted ecosystem services, adding demonstration value by showing that forests are more than just timber resources. The project’s innovative

certificate system, which integrates multiple ecosystem services (CO_2, water, biodiversity), illustrates a new model for monetizing environmental benefits

7. Policy implications: Indicate any important achieved targets contributing to the future implementation, design, or take-up of regional, national, or European legislation. Please highlight any potential unintended impacts, bottlenecks, or barriers to the implementation of your project due to regional, national, or European legislation including recommended actions further to actions already taken to overcome these barriers.

The LIFE Future Forest project has made strides in influencing policy at various levels, contributing to the future implementation and design of regional, national, and European legislation on sustainable forest management. One of the project's key achievements has been its contribution to the broader recognition of ecosystem services, such as water filtration, biodiversity, and climate adaptation, in forest management. These services go beyond the traditional view of forests as merely CO_2 sequestration areas or timber producers. By introducing a more holistic approach to forest management, the project has set the foundation for future legislative changes that support sustainable practices.

However, the project encountered several bottlenecks due to existing legislative frameworks.

The project faced barriers related to the focus on CO_2 sequestration under the Kyoto Protocol, which restricts the broader valuation of forests for other ecosystem services. This narrow focus has made it difficult to integrate more comprehensive management practices into policy, although LIFE Future Forest has demonstrated the importance of doing so.

Another challenge lies in the lack of formal certification systems for ecosystem services like water filtration and biodiversity. With the absence of legal recognition interest from private companies into the Future Forest Fonds was missing. Certification systems like the Future Forest Fonds need to be formalized and integrated into national and regional policies to provide greater incentives for sustainable forest management.

Additionally, outdated perceptions of natural vegetation have hindered policy progress. Many policymakers continue to rely on outdated models of forest conditions from the 1950s, which are no longer suitable for addressing current climate and environmental challenges. This has delayed the adoption of more forward-thinking forest management strategies that align with the realities of climate change. It is important to raise awareness for the relevance of forest adaptation to the current / future climate.

Moreover, while the EU has advanced in recognizing the multiple services forests provide, many regional and national policies have not kept pace. For example, politicians in Germany are currently pushing for more carbon dioxide to be stored in the forests. At the same time, the quota for timber construction and the use of timber should increase. This is a conflict of goals. The results of our project suggest that it makes sense to regularly thin and use forests, to create a permanent forest and to keep stocks in the forest limited. This is also optimal for the forest's ecosystem services, such as cooling the landscape.

In conclusion, the rapid progression of climate change highlights the urgent need for legislative reform to support sustainable forest management. Without updated policies that integrate broader ecosystem services and modern forest management techniques, projects like LIFE Future Forest will continue to face resistance. Stronger political backing and legislative recognition of ecosystem services are essential to overcoming these barriers and ensuring the long-term success of sustainable forestry initiatives and to honour the intergenerational contract.