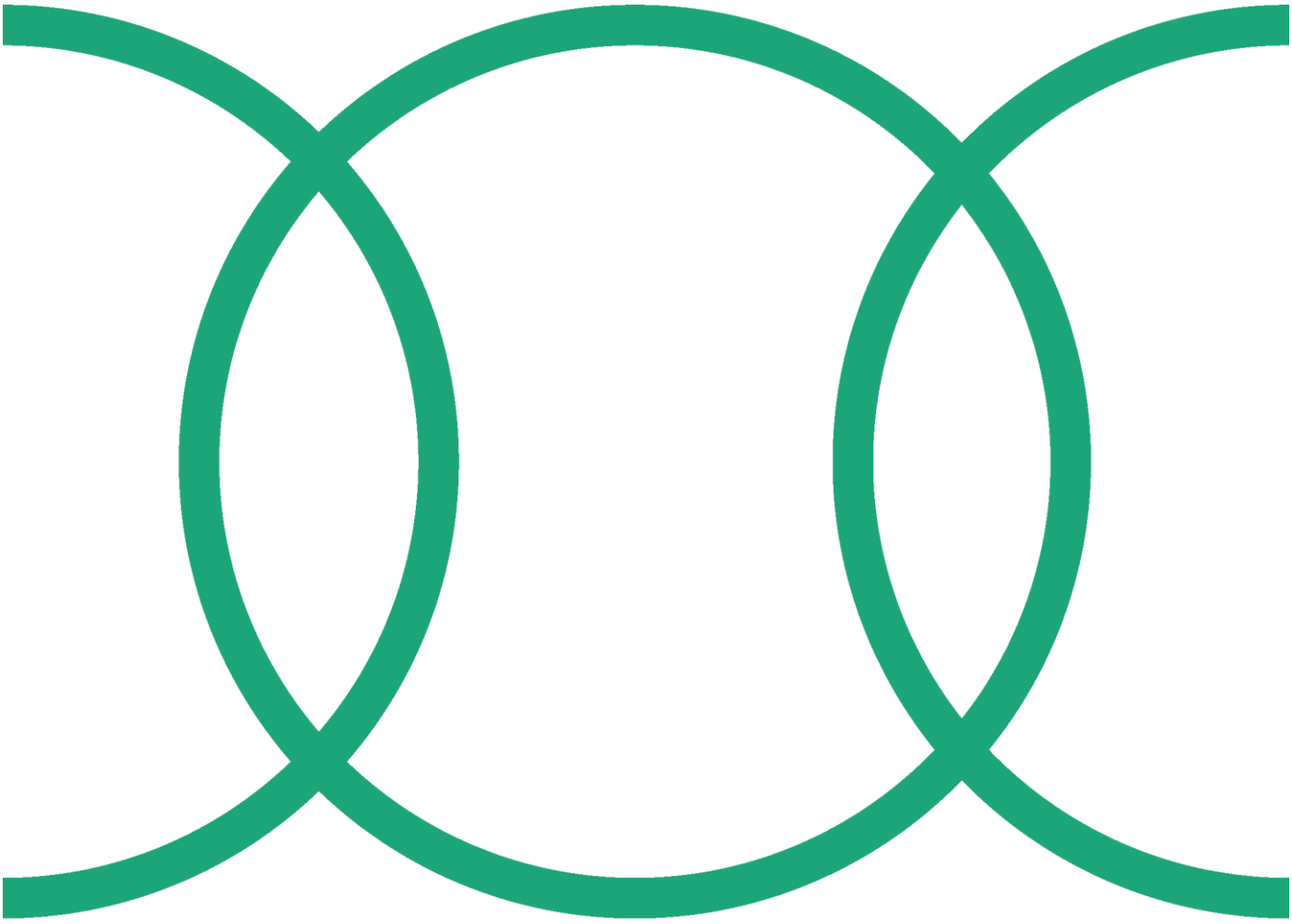
D1.3 Practice Abstracts – batch 1

FOREST4EU



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Executive Summary

This document represents deliverable **D1.3 "Practice Abstracts – batch 1"** elaborated in the frame of Task 1.3 of Work Package 1 of the FORESTS4EU project. This document, prepared by partner S2i (WP1 leader), presents the first batch of **101 Practice Abstracts** (short summaries for practitioners and other stakeholders following the EIP-AGRI common format) elaborated by the members of the five established ITHubs. Each of these Practice Abstracts presents a short summary of one innovation collected in Task 1.2. Following the methodology presented in D1.1 "Methodological approach for the management of the five ITHubs", all these innovations were identified and collected by the ITHub members from existing practical knowledge coming from **86 European forestry and agroforestry Operational Groups (OGs)**. Based on those innovations, the FOREST4EU consortium prepared **176 Extended Summaries** as presented in D1.2 "Extended summaries of practical knowledge from selected EIP-AGRI OGs".

A second batch with 75 additional Practice Abstracts will be submitted as the **D1.4 "Practice Abstracts – batch 2"** by M28 (April 2024).

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1. Introduction

The main goal of T1.3 "Elaboration of "practice abstracts" from collected knowledge" is the preparation of at least **150 Practice Abstracts** (30 for each ITHub) for forestry and agroforestry practitioners and related stakeholders based on practical knowledge (innovations) coming from selected Operational Groups (OGs). These OGs are dealing with the topics of the five established ITHubs ((1) wood mobilisation, (2) adaptation to climate change, (3) sustainable forest management & ecosystem services, (4) non-wood forest products and (5) agroforestry.

All Horizon multi-actor projects and thematic networks, as well as all OGs, use a common format developed by EIP-AGRI Network to provide farmers, foresters, advisers or other interested stakeholders with concise and short practical information, so-called "**Practice Abstracts**" (PAs). As explained by the EIP-AGRI Network, the use of this common format facilitates the exchange of knowledge, but also the contact between different practitioners and stakeholders.

Until 2023, all PAs were available in a **unique repository of practical knowledge** across the EU via the EIP-AGRI project database which supports the dissemination of results of all interactive innovation projects. However, as the EIP-AGRI Network became part of the EU CAP Network in 2023, its website and databases were no longer updated from the 1st of that year, being all the new and up-to-date information available on the EU CAP Network website. In 2023, the publication of an updated EIP-AGRI common format for Horizon multi-actor projects 2021-2027 was announced on the EU CAP Network website, however, by April 2024, this new common format template version is not available yet.

Since the present document (D1.3) with the first batch of PAs should be submitted by the 30th of April 2024, in agreement with the Project Officer, the FOREST4EU partners have used the "old" version of the EIP-AGRI common format. Each of the FOREST4EU PAs includes a first part in **English** (short title and short summary of the innovation) and a second one in an **additional European national language** (also short title and short summary of the innovation).

As soon as the updated common format is available, the FOREST4EU project will share all prepared PAs with the EIP-AGRI Network to make them available in the repository of practical knowledge. As indicated previously, this repository is now available on the EU CAP Network website.

2. Collection of existing practical knowledge (innovation) from forestry and agroforestry Operational Groups

Following the methodology developed by S2i (WP1 leader) and presented in D1.1. "Methodological approach for the management of the five ITHubs", in April 2023 the members of the five ITHubs identified the main challenges and needs faced by the foresters and other practitioners regarding the specific topics of established ITHubs ((1) wood mobilisation, (2) adaptation to climate change, (3) sustainable forest management & ecosystem services, (4) non-wood forest products and (5) agroforestry).

Based on these findings (explained in D1.2 "Extended summaries of practical knowledge from selected EIP-AGRI OGs"), the ITHubs collected practical knowledge on the innovations generated by selected EIP-AGRI OGs. These innovations tackle identified problems and needs. The collection of the innovations was carried out through the dedicated analysis of the outcomes of the corresponding OGs belonging to each ITHub. This was done in agreement and with the collaboration of the coordinators of all selected OGs. In total, **86 European forestry and agroforestry OGs** were contacted and involved in the project.

3. Elaboration of Extended Summaries

Based on this collected material and the direct exchange with the OGs, between August and October 2023, the members of the different ITHubs elaborated an Extended Summary (ES) in English (2 – 4 pages) for each identified innovation. For this purpose, a dedicated template was developed by S2i (WP1 leader) as described in D1.1. It is important to highlight that the results from forestry and agroforestry OGs are only available in the national language

of the countries where the OGs were or are established. Following its approach, FOREST4EU will make this practical knowledge on innovations available to a broader public across Europe, improving the transfer of practical knowledge from the local/national level to the EU level.

Finally, the consortium was able to produce a total of **176 ES**. The completed list of the FOREST4EU ES is available in D1.2 "Extended summaries of practical knowledge from selected EIP-AGRI OGs". These ES are key for the preparation of PA to be delivered to EIP-AGRI (T1.3), factsheets for their international dissemination through existing online repositories (T1.4), but also for WP2 (Capacity building), WP3 (Policy learning from OGs) and WP4 (Communication, dissemination and exploitation).

4. Preparation of Practices Abstracts

From March 2024, and under the coordination of S2i, all the members of the five ITHubs participate in the elaboration of the PAs based on the FOREST4EU ES. Having always in mind the end users (foresters, practitioners and other stakeholders), the ITHubs members ensured that these PAs used an easy-to-understand language and were written with an applicable perspective. Each PA includes a description of the innovation, practical recommendations (e.g. what would be the main added value/benefit/opportunities to the end-user if the innovation is implemented? How can the practitioner make use of the innovation?) and contact information.

All produced PA are available in English and also in one of the national languages from the consortium (Croatian, Finish, French, German, Italian, Latvian, Portuguese, Slovenian and Spanish).

5. Batch 1 of Practice Abstracts

The first batch of FOREST4EU PAs can be found below. Even though the inclusion of 75 PAs was anticipated for this deliverable as indicated in the FOREST4EU Grant Agreement, the partners were able to elaborate a larger number, with a total of **101** prepared PAs:

- 20 PAs for ITHub 1 "Wood mobilisation"
- 23 PAs for ITHub 2 "Adaptation to climate change"
- 27 PAs for ITHub 3 "Sustainable forest management & ecosystem services"
- 22 PAs for ITHub 4 "Non-wood forest products"
- 9 PAs for ITHub 5 "Agroforestry"

Additional PAs will be prepared by the project and submitted as official D1.4 "Practice Abstracts – batch 2 in M28 (April 2025). It is foreseen that D1.4 will include 75 new PAs.

ITHub 1 – Wood mobilisation (20 PAs)

1.1. Growing Stock Volume Map to support forest operation planning (English)

To effectively plan forest operations and optimize resource allocation, it is important to map the Growing Stock Volume (m3/ha) within a specific area. This information plays a critical role in economic evaluations of forest operations and supporting forest management planning. These mappings have been successfully implemented throughout the Tuscany Region as part of the GO-SURF initiative. By utilizing data from the National Forest Inventory plots, a high-resolution map of Growing Stock Volume has been generated for all regions in Tuscany. This technology reduces the costs associated with data acquisition and also grants small forest owners access to this invaluable information. Additionally, forest companies seeking suitable forests for logging purposes can benefit significantly from these comprehensive maps. The resulting map is conveniently accessible through a Decision Support System Platform, empowering users to query the data through interactive tools like drawing or uploading polygons. The way to query the data was co-designed with farmers, forest owners, forest managers and forest companies in order to be sure to fit their needs. Accessing the map does not require users to have knowledge of complex models and algorithms, knowledge of remote sensing data or national inventory data. As suggested by forest owners, managers, and companies involved in the co-design of the platform, the Growing Stock Volume map allows for a better understanding of wood resources within an area and is useful for assessing forest operations and management activities in a sustainable way. Francesca Giannetti (francesca.giannetti@unifi.it), website: https://www.go-surf.it/, video: https://youtu.be/tIyNjOTKPXY

Augošo koksnes krājumu karte mežsaimniecības darbu plānošanas atbalstam (Latvian)

Lai efektīvi plānotu mežsaimniecības darbus un optimizētu resursu izmantošanu, ir svarīgi kartēt augošo koksnes krājumu apjomu (m3/ha) noteiktā teritorijā. Šī informācija ir īpaši svarīga mežsaimniecības darbību ekonomikas izvērtēšanā un mežu apsaimniekošanas plānošanā. Kartēšana ir sekmīgi ieviesta Toskānas reģionā kā daļa no GO-SURF iniciatīvas. Izmantojot datus no Nacionālās Mežu inventarizācijas plāniem, ir radīta augstas izšķirtspējas Augošo koksnes krājumu karte visiem Toskānas reģioniem.Šī tehnoloģija samazina izdevumus, kas saistīti ar datu iegūšanu un sniedz meža īpašniekiem pieeju vērtīgai informācijai. Papildus mežsamniecības kompānijas, meklējot piemērotus mežus mežizstrādei, gūst ievērojamu labumu no šīm visaptverošajām kartēm.Iegūtā karte ir ērti sasniedzama caur Lēmumu atbalsta sistēmas platformu, kas mudina lietotājus pieprasīt datus, izmantojot interaktīvus rīkus, piemēram, daudzstūru zīmēšana vai augšupielāde. Veids, kādā pieprasīt datus, bija radīts kopā ar lauksaimniekiem, mežu īpašniekiem, mežsaimniecības vadītājiem un mežsaimniecības kompānijām, lai tas atbilstu viņu vajadzībām.Piekļuve kartei neprasa tās lietotājiem zināt sarežģītus modeļus un algoritmus, zināšanas par attālinātas izpētes datiem vai nacionālās inventarizācijas datus. Kā ieteica meža īpašnieki, vadītāji un platformas izveidē iesaistītās kompānijas, Augošo koksnes krājumu apjopma karte ļauj labāk saprast koksnes resursus reģionā un ir noderīga, lai novērtētu mežsaimniecības darbību un vadības aktivitātes ilgtspējīgā veidā. Francesca Giannetti (francesca.giannetti@unifi.it) website: https://www.go-surf.it/, video: https://youtu.be/tIyNjOTKPXY

1.2. Standardization of available forest data: the first step to support wood mobilization in Friuli Venezia Giulia (English)

This is a project for the joint management of forests in the Autonomous Region of Friuli Venezia Giulia. Approximately 32% of the region is covered by forests. However, their use is much lower than their growth. Sustainable forest management faces challenges such as the fragmentation of forest ownership, which makes it impossible to plan resources, plan their use by forestry companies and develop an adequate network of forest roads. The project aims to address these problems and implement a new cooperative approach to the management of fragmented ownership forest stands. To achieve this goal standardisation of information on forests was done. The project provides for the first time standardisation information on forest resources. A geodatabase was created and centralises forest data can be queried for different administrative levels. The collected and standardised geographic data were classified into three types: cartographic, forest management layers and environmental constraints. The project ensures the accuracy of the data published in the decision support system platform developed as part of the project. This enables data sharing between stakeholders, including forest owners, management agencies, researchers and other interested parties. https://www.legnoservizi.it/attivita/innovazione/, Giorgio Alberti (giorgio.alberti@unud.it), Luca Cadez (luca.cadez@uniud.it), Francesca Giannetti (francesca.giannetti@unifi.it).

Standardizacija razpoložljivih podatkov o gozdovih: prvi korak v podporo mobilizaciji lesa v Furlaniji Julijski krajini (Slovenian)

Gre za projekt skupnega upravljanja gozdnih posesti, avtonomne dežele Furlanije-Julijske krajine. Približno 32% regije je pokrite z gozdovi. Vendar je njihova izkoriščenost veliko manjša od njihove rasti. Trajnostno gospodarjenje z gozdovi se sooča s izzivi kot so razdrobljenost lastništva gozdov, ki onemogoča načrtovanje virov, načrtovanje njihove uporabe s strani gozdarskih podjetij in razvoj ustreznega omrežja gozdnih cest. Projekt si prizadeva za reševanje teh vprašanj in izvajanje novega skupnega pristopa k upravljanju razdrobljenih gozdnih posesti. Za dosego tega cilja so standardizirali informacije o gozdovih. Projekat je prvič zagotovil standardizacijo informacij o gozdnih virih. Vzpostavljena je bila geodatabaza, v kateri so centralizirani podatki o gozdovih, po katerih je mogoče povpraševati na različnih upravnih ravneh. Zbrane in standardizirane geografske podatke so razvrstili tri vrste: kartografski in gozdnogospodarski sloj ter okoljske omejitve. Projekt zagotavlja točnost podatkov, ki so objavljeni v platformi sistema za podporo o odločanju, razvitem v okviru projekta. Ta omogoča izmenjavo podatkov med zainteresiranim stranmi, vključno z lastniki gozdov, agencijami za upravljanje, raziskovalci in drugi zainteresiranimi. https://www.legnoservizi.it/attivita/innovazione/ Giorgio Alberti (giorgio.alberti@unud.it), Luca Cadez (luca.cadez@uniud.it), Francesca Giannetti (francesca.giannetti@unifi.it).

1.3. PRI.FOR.MAN Dashboard: Overview of Wood Resources at NUT3 Level to Support Wood Mobilization and Value Chain (English)

The OG PRI.FOR.MAN in Italy (https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali) has developed different forest geographic layers that describe forest resources (growing stock volume, forest types, accessibility, and forest roads maps) implemented in a decision support system tool. A dashboard was also developed to provide summarized information, featuring easily understandable graphs and tables. It could help to identify areas in the region where new value chains linked to wood mobilization can potentially be established. The dashboard, by providing information on the growing stock volume accessible through two harvesting systems, can be utilized to identify areas where the road network is not well established, thus highlighting the need for investments in road planning. The members of the OG strongly believe that such dashboards should be developed for public utility, providing support to the forest sector, as they can play a key role in incentivizing the emergence of new value chains through policies and measures. Contact: Giorgio Alberti giorgio.alberti@unud.it - Luca Cadez luca.cadez@uniud.it - Francesca Giannetti francesca.giannetti@unifi.it

PRI.FOR.MAN Tableau de bord: Aperçu des ressources en bois au niveau NUT3 pour soutenir la mobilisation du bois et la chaîne de valeur (French)

GO PRI.FOR.MAN en Italie (https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali) a développé un système d'informations géographiques avec différentes couches forestières qui décrivent la ressource (volume de bois sur pied, types de forêts, accessibilité et cartes des routes forestières) et qui sont mises en œuvre dans un outil d'aide à la décision. Un tableau de bord a également été développé pour fournir des informations synthétiques, comprenant des graphiques et des tableaux facilement compréhensibles. Cela pourrait aider à identifier les zones de la région où de nouvelles chaînes de valeur liées à la mobilisation du bois peuvent potentiellement être établies. Le tableau de bord, en fournissant des informations sur le volume de bois sur pied accessible via deux systèmes de récolte, peut être utilisé pour identifier les zones où le réseau routier n'est pas bien établi, soulignant ainsi la nécessité d'investir dans la planification routière. Les membres du GO sont fermement convaincus que de tels tableaux de bord devraient être développés dans un but d'utilité publique, apportant un soutien au secteur forestier, car ils peuvent jouer un rôle clé dans l'émergence de nouvelles chaînes de valeur par le biais de politiques et de mesures incitatives. Contact : Giorgio Alberti giorgio.alberti@unud.it - Luca Cadez luca.cadez@uniud.it - Francesca Giannetti francesca.giannetti@unifi.it

1.4. New market for Silver fir products (LVL) (English)

The Auvergne Promobois inter-professional association (FIBOIS AURA www.fibois-aura.org) works on the LVL (Laminated Veneer Lumber) in Silver fir to achieve the expected quality and the setting up of the manufacturing in Auvergne region. Furthermore, the association FIBOIS AURA identified added value potential for Silver fir - outlets for peeling as well as for small sections thus reducing the difficulties associated with drying. The FIBOIS AURA was supported by two companies C.B.D and Scierie Borie. Along the way, TOUBOIS Company located in Chasseneuil sur Bonnieure strengthened the partnership by bringing the equipment capable of peeling very large fir wood with diameters of up to 1.20 meters. Only exotic wood peelers can meet this demand and there are few of them on French territory. An international market study was carried out on the basis of specifications and the demand for service providers. The specific needs for the trees to be harvested have been defined: cutting plots were visited and trees were marked with the sawmill technicians according to quality needs. The fir logs are classified upon their arrival at the park in the sawmills. The identified and sorted logs are then transported to the peeling company TOUBOIS. 2000 veneers were selected and sent from the TOUBOIS company to the Raute company in Finland for monitoring and analysis of each stage of LVL manufacturing. For more information, contact e-mails are contact@fibois-aura.org and a.laffont@fibois-aura.org

Novo tržište za proizvode od srebrne jele (LVL) (Croatian)

Međustrukovna udruga Auvergne Promobois (FIBOIS AURA www.fibois-aura.org) radi na razvoju furnir ploča (LVL) od srebrne jele s ciljem postizanja očekivane kvalitete i mogućnosti pokretanja proizvodnje u Auvergneu. Nadalje, Udruga je identificirala potencijal dodane vrijednosti za jelu – postrojenja za ljuštenje čime bi se smanjile poteškoće povezane sa sušenjem. FIBOIS AURA su podržale dvije tvrtke C.B.D i Scierie Borie. Naknadno se uključila tvrtka TOUBOIS iz Chasseneuil sur Bonnieure koja je ojačala partnerstvo opremom pogodnom za ljuštenje vrlo velikih jelovih stabala promjera do 1,20 metara. Samo ljuštilice za egzotično drvo mogu zadovoljiti tu potražnju, a takvih je malo na francuskom teritoriju. Provedena je analiza međunarodnog tržišta na temelju specifikacija i zahtjeva pružatelja usluga. Definirane su specifične potrebe za drvom za sječu na temelju kojih su pilanski tehničari odredili lokacije i označili stabla. Trupci jele se po dolasku u pilanu klasificiraju, identificiraju i sortiraju, pa zatim prevoze u tvrtku za guljenje TOUBOIS. Odabrano je 2000 furnir ploča i poslano iz tvrtke TOUBOIS u tvrtku Raute u Finskoj na praćenje i analizu svih faza proizvodnje. Za više informacija, kontakt e-mailovi su contact@fibois-aura.org i a.laffont@fibois-aura.org

1.5. Implementation of innovative forestry trials: improvement at lower cost (English)

The aim of the OG RAISON project is to evaluate the economic and silvicultural benefits of managing young deciduous stands using low-density designation and routing compared to conventional forest management through full thinning. The selected plot is in the region of Valdalliere and covers an area of 1.31 ha. The main tree species is beech (75 %), which is planted with chestnut (25 %). Two successive reserve markings were made on the plot, the first on the beech trees and the second on the future stems. The plot was divided into 4 blocks of 0.3 ha each, where different management methods could be tested. Management method ''A'' was based on full thinning, ''B'' on low-density marking (QD silviculture) and pruning, ''C'' on low-density designation and girdling, and ''D'' was a control method without intervention. None of the methods were repeated. The data will be analysed to determine if the interventions maintain growth and if the initial diameter accurately reflects growth vigour, to determine the effects of the interventions on the quality of the target trees, and to quantify tree balance parameters. Finally, the time and cost of the interventions and the revenue generated are monitored" 35 to 40 "potential" trees have been identified and marked. They are monitored individually until the final harvest, ideally with measurements first every three years and then before each thinning. It is desirable that the monitoring of such a trial continues until the stand is harvested. Of course, the trial will also provide results well before the harvest, but these will only relate to the measured period. More information : https://hautsdefrance-normandie.cnpf.fr/projet-raison, romain.mani@cnpf.fr

Izvajanje inovativnih poskusov v gozdarstvu: izboljšanje z nižjimi stroški (Slovenian)

Cilj projekta RAISON je ocena ekonomske in gozdarske koristi gospodarjenja z mladimi listnatimi sestoji z uporabo določanja in usmerjanja z nizko gostoto v primerjavi s konvencionalnim gozdnim gospodarjenjem, ki se temelji na popolnem redčenju. Izbrano posestvo je v občini Valdalliere na 1,31 ha velikem zemljišču. Glavna vrsta je bukev (75%), posajena s kostanjem (25%). Na rastišču sta bili izvedeni dve zaporedni rezervni označitvi, prva je na bukovim drevesom, druga pa bodoča stebla. Parcela je bila razdeljena na 4 bloke po 0,3 ha, pri čemer je bilo mogoče preizkusiti različne metode gospodarjenja. Metoda gospodarjenja ""a"" je temeljila na popolnem redčenju, ""b"" na označevanju nizke gostote (QD silviculture) in obrezovanju, ""c"" na označevanju nizke gostote in obročkanju, ""d"" pa je bila kontrolna metoda brez posegov. Nobena od metod ni bila ponovljena. Podatki, bodo analizirani za ugotovljanje, ali posegi ohranjajo rast in ali je začetni premer pravi odraz vitalnosti, da se ugotovi vpliv posegov na kakovost ciljnih dreves in da se količinsko opredelijo parametri ravnovesja dreves. Nazadnje bo spremljanje časa in stroškov posegov ter ustvarjenih prihodkov." Določenih in označenih je bilo 35 do 40 "možnih" dreves. Do končne sečnje se jih bo spremljalo posamično, v idealnem primeru z meritvami na začetku vsake tri leta in nato pred vsakim redčenjem. Vsaka podsadba se bo redno vzdrževala v skladu z načrtovanim protokolom. Zaželeno je, da spremljanje takšnega poskusa traja vse do spravila sestoja. Seveda bo poskus dal rezultate tudi precej pred sečnjo, vendar se bodo ti rezultati nanašali le na merjeno obdobje. https://hautsdefrance-normandie.cnpf.fr/projet-raison, romain.mani@cnpf.fr

1.6. Sylv'éclair a decision support tool for thinning in pine plantation (English)

SYLV'ÉCLAIR and its database, developed as part of the OG SPNA project, are designed to collect data from stands composed mainly of maritime pines and to provide tailored advice for these stands. This tool is designed to be adapted potentially to other planted species (Douglas fir, Scots pine, Scots pine, etc.) managed in normal height stands, provided it is equipped with forest standards and a growth model. In addition, although the first test phases of this interface will be carried out mainly in the populations of the Massif des Landes de Gascogne, the tool is intended for use throughout the national territory. The tool is based on the work of Jean-Paul Maugé. It represents a compromise between maximum stand production and the individual growth of each tree. These tables make it possible to determine the minimum and maximum densities between which the population must lie for a given area. If the actual density is above the maximum limit, this density should be specified and approximated to the value close to the minimum limit. The tool is suitable for all types of terrain. The only thing that changes is the age at which the thinning is performed. A mobile tool for smartphones will be available. The app warns when thinning is imminent or when thinning should be delayed. If thinning has to wait, the app will indicate the recommended time for the procedure. The tool also provides you with instructions on how to organise the thinning and marketing. More information: https://nouvelle-aquitaine.cnpf.fr/sites/socle/files/cnpf-old/article_eclaircie_pm.pdf, cecile.maris@cnpf.fr

Sylv'éclair - orodje za podporo odločanju pri redčenju v nasadih bora (Slovenian)

SYLV'ÉCLAIR in njegova zbirka podatkov, razvita v okviru projekta SPNA, sta namenjena zbiranju podatkov iz sestojev, sestavljenih pretežno iz obmorskega bora, in zagotavljanju njim prilagojenih nasvetov. Vendar je orodje zasnovano tako, da je mogoče vanj vključiti vse druge gozdne vrste (duglazija, rdeči bor bor, črni bor itd.), s katerimi se gospodari v običajnih visokih sestojih, če je opremljeno z gozdnimi standardi in modelom rasti. Poleg tega, čeprav prve faze testiranja tega vmesnika potekajo predvsem v populacijah masiva Massif des Landes de Gascogne, je orodje namenjeno uporabi na celotnem nacionalnem ozemlju. Orodje temelji na delu Jean-Paula Maugéja. Ta ustreza kompromisu med maksimalno proizvodnjo sestoja in individualno rastjo vsakega drevesa. Te tabele omogočajo, da se za določen obseg določita najmanjša in največja gostota, med katerima se mora nahajati populacija. Kadar je dejanska gostota večja od najvišje meje, je treba to gostoto razjasniti in jo približati vrednosti, ki je blizu najnižji meji. Orodje je primerno za vse vrste terena. Edina stvar, ki se spremeni, je starost, pri kateri se izvede redčenje. Na voljo bo mobilno orodje za pametne telefone. Aplikacija bo opozarjala na začetek redčenja in če je treba z redčenjem počakati. Če je treba z redčenjem počakati, bo aplikacija navedla priporočeni datum posega. Orodje vas bo opozorilo tudi na navodila glede organizacije rezi in trženja. https://nouvelle-aquitaine.cnpf.fr/sites/socle/files/cnpf-old/article_eclaircie_pm.pdf, cecile.maris@cnpf.fr

1.7. Mechanical structural classification for Pinus pinaster ssp atlantica in the northern Iberian Peninsula approved by EU Normalization Committee (English)

The Operational Group Forest management systems in quality timber-producing forests (SiGCa, https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sigca-sistemas-de-gesti%C3%B3n-forestal-en-bosques.html) is launching a project to increase the competitiveness of the forestry and industrial sector related to maritime pine, through innovation throughout the value chain, applying knowledge and technologies, planning and executing forest management, and standardising procedures with the ultimate aim of launching high added value timber products on the market, improving profitability and, consequently, strengthening the sector and making it more competitive. For this purpose, SiGCa is launching the PiMa project, which will make new proposals to improve the dynamics of forest and industrial management of the entire sector related to maritime pine (Pinus pinaster subsp. atlantica) timber. The results of this initiative could affect the future management of more than 700,000 hectares of maritime pine, which serves an industrial sector of around 400 companies. PiMa-SiGCa aims to establish the necessary improvements so that this industry can be supplied with higher quality wood that will guarantee them to a greater extent the possibility of manufacturing and developing technological products highly demanded by today's society. Contact: joseluis.villanueva@cesefor.com

Clasificación estructural mecánica para el Pinus pinaster en el norte de la Península Ibérica aprobada por el Comité de Normalización de la UE (Spanish)

El Grupo Operativo Sistemas de gestión forestal en bosques productores de madera de calidad (SiGCa, https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sigca-sistemas-de-gesti%C3%B3n-forestal-en-bosques.html) lanza un proyecto para aumentar la competitividad del sector forestal e industrial relacionado con el Pino Marítimo, a través de la innovación en toda la cadena de valor, aplicando el conocimiento y las tecnologías, planificando y ejecutando una gestión forestal, y estandarizando los procedimientos con el fin último de lanzar al mercado productos de madera de alto valor añadido, mejorando la rentabilidad y, consecuentemente, fortalecer el sector y hacerlo más competitivo. Con este propósito, SiGCa pone en marcha el proyecto PiMa, que realizará nuevas propuestas para mejorar las dinámicas de gestión forestal e industrial de todo el sector relacionado con la madera de pino marítimo (Pinus pinaster subsp. atlantica). Los resultados de esta iniciativa podrían afectar a la futura gestión de más de 700.000 hectáreas de pino marítimo, de las que se sirve un sector industrial de en torno a 400 empresas. PiMa-SiGCa pretende establecer las mejoras necesarias para que esta industria pueda abastecerse de madera de mayor calidad que les garantizará en mayor medida la posibilidad de fabricar y desarrollar productos tecnológicos altamente demandados por la sociedad actual. Contacto: joseluis.villanueva@cesefor.com

1.8. LVL (Laminated Veneer Lumber) of fagus silvatica (English)

OG FAGUS implemented project Adding value to beech trees through innovation and improving the competitiveness of their forest industry value chain which resulted with development and testing of innovative LVL product using beech veneer from Spain. Aim was to reevaluate the beech wood value chain. LVL is a product that consists of the successive stacking of thin layers of wood, veneers, obtained by unrolling. Obtaining the material in this way has the following implications:

- Beech veneers used for the manufacture of LVL was the raw material of high-quality logs, large diameters, straight, with little taper and knots in order to obtain an adequate yield, volume and quality during unrolling. For this reason, it is to be expected that the manufacture of structural products with peeled veneer will offer superior properties to sawn timber of the same species.

- Bending tests have been carried out on small dimension and structural size specimens, as well as tensile tests perpendicular to the fiber. The results of the tests are satisfactory and encouraging, achieving good mechanical properties that indicate that the raw material is suitable for the production of this product. Comparing the properties of LVL tested in bending with those of sawn timber from the same source, the results have been improved in both bending strength and stiffness.

More information can be obtained by contacting joseluis.villanueva@cesefor.com or by visiting https://gofagus.es/ website.

Furnir ploče (LVL) od bukve (fagus silvatica) (Croatian)

FAGUS operativna skupina provela je projekt Dodana vrijednost bukve kroz inovacije i poboljšanje konkurentnosti lanca vrijednosti šumarske industrije koji je rezultirao razvojem i testiranjem inovativnih furnir proizvoda (LVL) od bukve porijeklom iz Španjolske. Cilj je bio preispitati lanac vrijednosti bukovog drva. LVL je proizvod koji se sastoji od uzastopnog slaganja tankih slojeva drva, furnira, dobivenih odmatanjem. Dobivanje materijala na ovaj način ima sljedeće implikacije:

- Bukov furnir koji se koristio za izradu LVL proizvoda bio je sirovina od visokokvalitetnih trupaca, velikih promjera, ravnih, s malo suženja i čvorova kako bi se dobila odgovarajuća izdašnost, volumen i kvaliteta prilikom odvijanja. Iz tog razloga, za očekivati je da će proizvodnja konstrukcijskih proizvoda s ljuštenim furnirom ponuditi vrhunska svojstva u odnosu na piljenu građu iste vrste.

- Ispitivanja savijanjem provedena su na uzorcima malih dimenzija i strukturnih dimenzija, kao i ispitivanja na vlačnost okomito na vlakno. Rezultati ispitivanja su zadovoljavajući i ohrabrujući, postignuta su dobra mehanička svojstva koja ukazuju da je sirovina prikladna za proizvodnju ovog proizvoda. Uspoređujući svojstva LVL-a testirana na savijanje sa svojstvima piljene građe iz istog izvora, rezultati su poboljšani i u čvrstoći na savijanje i u krutosti.

Više informacija možete dobiti ako kontaktirate joseluis.villanueva@cesefor.com ili posjetite web stranicu https://gofagus.es/

1.9. Visual structural grading tool and a mechanical structural grading tool (English)

OG FAGUS works on innovation and improving the competitiveness of the Spanish forest industry value chain through adding value to beech tree products. The structural grading tools have been developed for beech wood of Spanish origin which will allow beech timber to be used for structural products: beams, pillars, glued laminated timber, etc. Specifically, a structural visual grading and a mechanical grading have been developed. The structural visual grading consists of a wood industry operator who, on the basis of visual observation criteria of each piece of wood, can declare a resistance class. On the other hand, mechanical grading consists of the determination of a strength class with the use of a grading machine, which, based on the density of the wood and the natural vibration frequency of the piece, is able to determine the strength class. During the process, it has been found that beech wood obtains better resistance classes than the Spanish conifers approved for use in structures. Furthermore, the structural visual classification obtained 75% of wood suitable for use in structures, which allows to expand the customer market. A modification of the standards has been proposed for the improvement of yields, increase of graded wood yields and higher percentage use of high structural quality wood. More useful information on OG FAGUS could be obtained from joseluis.villanueva@cesefor.com or the website https://gofagus.es/

Alati za vizualno i mehaničko strukturalno ocjenjivanje (Croatian)

OG FAGUS radi na inovacijama i poboljšanju konkurentnosti lanca vrijednosti španjolske šumarske industrije kroz dodanu vrijednost proizvoda od bukve. Alati za strukturno ocjenjivanje razvijeni za bukovo drvo španjolskog podrijetla, omogućiti će uporabu bukovo drva za konstrukcijske proizvode: grede, stupove, lijepljeno lamelirano drvo itd. Razvijeni su alati za strukturno vizualno i mehaničko gradiranje (ocjenjivanje). Strukturno vizualno ocjenjivanje obuhvaća rukovatelja drvne industrije koji, na temelju kriterija vizualnog promatranja svakog komada drva, može proglasiti klasu otpornosti. S druge strane, mehaničko ocjenjivanje sastoji se od određivanja razreda čvrstoće pomoću stroja za gradiranje, koji na temelju gustoće drva i prirodne frekvencije vibracija komada može odrediti razred čvrstoće. Tijekom procesa utvrđeno je da bukovo drvo ima bolje klase otpornosti od španjolske crnogorice odobrene za upotrebu u građevinarstvu. Nadalje, strukturnom vizualnom klasifikacijom dobiveno je 75% drva prikladnog za upotrebu u konstrukcijama, što omogućuje širenje tržišta. Predložena je izmjena standarda radi poboljšanja iskoristivosti, povećanja iskoristivosti klasificiranog drva i većeg postotka uporabe sirovine visoke strukturne kvalitete. Više korisnih informacija o OG FAGUS možete dobiti na joseluis.villanueva@cesefor.com ili na web stranici https://gofagus.es/

1.10. Wood potentially available for harvesting activities (English)

OG Shared PRIvate FORest MANagement in Eastern Alps (PRI.FOR.MAN) considers the understanding of the volume that can truly be harvested to be of great importance for assessing the real value of forest utilization. So, the development of methodologies to enable companies to identify areas of higher value was conducted by the GO-PRI.FOR.MAN. Developed methodology for calculating the volume that can actually be harvested uses slope data derived from the digital terrain model and a regional map of wood volume derived from the integration of LiDAR remote sensing data and national forest inventory data as input. The operational limits of the extraction systems commonly used by companies and topographic limits (slope change) were considered. A series of regional-scale geographic layers along with new methodologies (integrated use of ground-based and remote sensing data) allow the application of research-developed methodologies in practice. The project aimed to provide a comprehensive assessment of the actual harvesting potential of forested areas, taking into account both natural terrain characteristics and the capabilities of the machinery used in logging operations. This approach helps companies identify areas with the highest potential for profitable utilization. For further information, you can contact Francesca Giannetti (francesca.giannetti@unifi.it) or click here https://www.legnoservizi.it/pri-for-man-dss-un-sistema-di-supporto-delle-decisioni-forestali-a-scala-locale/

Procjena potencijala šumskih područja za sječu (Croatian)

Operativna skupina PRI.FOR.MAN smatra da je ključno za procjenu stvarne vrijednosti šume razumijevanje količine koja se uistinu treba posjeći. Stoga je GO-PRI.FOR.MAN razvila metodologiju koje će tvrtkama omogućiti identificiranje područja veće vrijednosti. Razvijena metodologija za izračun volumena koji se treba posjeći koristi podatke o nagibu izvedene iz digitalnog modela terena i regionalnu kartu drvnog volumena izvedenu integracijom podataka daljinskog istraživanja LiDAR-a i podataka nacionalne inventure šuma kao ulaznih podataka. Također obuhvaća i operativna ograničenja sustava izvlačenja drvne sirovine koje tvrtke obično koriste i topografska ograničenja (promjene nagiba terena). Niz podataka s regionalne razini uz pomoć novih metodologija (integrirana uporaba podataka sa zemlje i daljinskih istraživanja) omogućuje primjenu rezultata istraživanja u praksi. Projekt je imao za cilj pružiti sveobuhvatnu procjenu stvarnog potencijala sječe šumskih područja, uzimajući u obzir i prirodne karakteristike terena i mogućnosti strojeva koji se koriste u sječi. Ovakav pristup pomaže tvrtkama odrediti područja s najvećim potencijalom za isplativo korištenje. Za daljnje informacije možete kontaktirati Francescu Giannetti (francesca.giannetti@unifi.it) ili kliknite ovdje https://www.legnoservizi.it/pri-for-man-dss-un-sistema-di-supporto-delle-decisioni- forestali-a-scala-locale/

1.11. Growing Stock Volume mapping using Remote Sensing Data (English)

The aim of the GO-FORTRACK project is to develop and test a structured, modular decision support system that simplifies the implementation of precision forestry. This system will enable the transfer of research-based practices to forest sector enterprises, including technologies such as geographic information systems (GIS) and remote sensing, spatial modelling of forests, and computer algorithms integrated into decision support systems. In this context, the OG worked to develop the growing stock map of forest resources. This mapping is important to determine the variability within each individual forest stand and area. For this purpose, an area-based approach was used, combining the field plot data obtained from the forest management plans with freely available remote sensing data such as the multi-temporal Sentinel-2 products and GEDI lidar. In this way, a map of the amount of the growing stock was created and integrated into the GIS decision support system. This map can be used for future forest management planning. The data used for mapping the volume of growing stock already available in the companies, as it was collected for the forest management plans required by the Calabrian regional law. However, for more accurate maps, it would have been better to use a sampling scheme that also takes into account the variability of the remote sensing variables. Nevertheless, the system, which relies exclusively on freely available data, makes it possible to map the volume of wood and analyse the variability within a forest plot. Francesca Giannetti, francesca.giannetti@unifi.it

Kartiranje obsega zalog z uporabo podatkov daljinskega zaznavanja (Slovenian)

Cilj projekta GO-FORTRACK je razviti in preizkusiti strukturiran modularni sistem za podporo odločanju, ki poenostavlja izvajanje praks preciznega gozdarstva. Ta sistem bo omogočil prenos na raziskavah temelječih postopkov na podjetja v gozdarskem sektorju, vključno s tehnologijami, kot so geografski informacijski sistemi (GIS) in daljinsko zaznavanje, prostorsko modeliranje gozdov ter računalniški algoritmi, vključeni v sisteme za podporo odločanju. V tem kontekstu je OG pripravil zemljevid gozdnih virov, na katerem so prikazane rastoče zaloge. To kartiranje je pomembno za ugotavljanje variabilnosti znotraj posameznih gozdnih sestojev in območij V ta namen je bil uporabljen pristop, ki temelji na površini, pri čemer so bili podatki o terenskih ploskvah, pridobljeni v okviru gozdnogospodarskih načrtov, povezani s prosto dostopnimi podatki daljinskega zaznavanja, kot so več časovni izdelki Sentinel-2 in lidar GEDI. Tako je bil izdelan zemljevid količine rastoče zaloge na zadevnem območju in vključen v sistem za podporo odločanju GIS. Ta zemljevid se lahko uporabi pri prihodnjih dejavnostih načrtovanja gospodarjenja z gozdovi. Podatki, ki so bili uporabljeni za kartiranje obsega rastoče zaloge, so v podjetjih že obstajali, saj so bili pridobljeni za gozdnogospodarske načrte, ki jih zahteva deželni zakon Kalabrije. Za natančnejše karte bi bilo bolje uporabiti načrt vzorčenja, ki bi upošteval tudi spremenljivost spremenljivk daljinskega zaznavanja. Kljub temu sistem, ki se opira izključno na prosto dostopne podatke, omogoča kartiranje obsega lesa in analizo variabilnosti znotraj gozdne parcele. Francesca Giannetti, francesca.giannetti@unifi.it

1.12. New methodology for Douglas-fir timber qualification (English)

Douglas fir has wood with physical-mechanical characteristics that vary depending on its origin, altitude, silvicultural treatments, and other conditions. The project aimed to enhance its profitable use in the forest supply chain through accurate classification and identification of various potential uses. A rapid analysis method was developed to classify Douglas fir roundwood for structural purposes, allowing it to be assigned to different categories based on its quality. This facilitated the production of high-quality sawn timber for various purposes such as construction, carpentry, and packaging. Innovation activities focused on transferring expertise to assess wood quality, aiming to integrate the forest-wood chain and increase its profitability. Additionally, the strengths of the local Douglas fir supply chain in the Tuscany region were highlighted, including the availability of local resources, changes in the global wood market, and research and innovation expertise in the region. This could contribute to creating a more robust and competitive local supply chain for Douglas fir. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane, solaria.anzilotti@unifi.it

Nueva metodología para la calificación de la madera de abeto Douglas (Spanish)

El abeto Douglas tiene una madera con características físico-mecánicas que varían según su origen, altitud, tratamientos silvícolas y otras condiciones. El proyecto buscó mejorar su uso rentable en la cadena de suministro forestal mediante una clasificación precisa y la identificación de diversos usos potenciales. Se desarrolló un método rápido de análisis para clasificar la madera redonda de abeto Douglas para usos estructurales, lo que permitió asignarla a diferentes categorías según su calidad. Esto facilitó la producción de madera aserrada de alta calidad para diversos fines, como construcción, carpintería y embalaje. Las actividades de innovación se centraron en transferir experiencia para evaluar la calidad de la madera, con el objetivo de unir la cadena forestal-maderera y aumentar su rentabilidad. Además, se destacaron las fortalezas de la cadena de suministro local de abeto Douglas en la región de Toscana, incluida la disponibilidad de recursos locales, los cambios en el mercado global de madera y la experiencia en investigación e innovación en la región. Esto podría contribuir a crear una cadena de suministro local más robusta y competitiva para el abeto Douglas. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane, solaria.anzilotti@unifi.it

1.13. UAV to map growing stock volume for sharing forest management plan (English)

OG Shared PRIvate FORest MANagement in Eastern Alps (PRI.FOR.MAN) developed technological innovation by applying the UAV to map growing stock volume for sharing forest management plan. The aim was to develop a decision support system that promoted a shared management approach among landowners. The project mapped forest resources across the region by using data from the national forest inventory and LiDAR data to identify the most promising areas. The simulated development of shared forest management plans demonstrated their feasibility in four test areas. Ground plots were measured through field sampling, and surveyed by using a drone to create a hybrid canopy digital model. Based on gathered data a map of woody volume, basal area, and dominant height in the area with greater accuracy. The growing stock volume map was used for the calculation of the value of each forest in the shared forest management plan. Fieldwork for collecting data on at least sample areas is always necessary and remains costly. However, when compared to forest management plans developed using traditional methods, the number of sample areas required is significantly reduced. The costs can be reduced when multiple landowners decide to pool resources to conduct surveys. For more details on this innovation, please contact Francesca Giannetti (francesca.giannetti@unifi.it) or visit the website https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali

Primjena bespilotne letjelice za mapiranje volumena šumskog fonda za zajedničke planove gospodarenja šumama (Croatian)

Operativna skupina PRI.FOR.MAN razvila je tehnološku inovaciju primjenom bespilotne letjelice (UAV) za mapiranje volumena šumskog fonda za zajedničke planove gospodarenja šumama. Cilj je bio razviti sustav podrške odlučivanju koji će među šumoposjednicima promicati zajedničko upravljanje. Mapiranjem šumskih resursa regije, uporabom podataka iz nacionalne inventure šuma i LiDAR podataka, identificirana su područja s najviše potencijala. Simulacijom razvoja zajedničkih planova gospodarenja šumama, pokazana je njihova izvedivost na četiri testna područja. Parcele su izmjerene putem terenskog uzorkovanja, pregledane pomoću drona za izradu digitalnog modela krošnje. Na temelju prikupljenih podataka s precizno je mapiran drvni volumen, područje osnove i dominantna visina u tom području. Nadalje, karta volumena drvne zalihe korištena je za izračun vrijednosti svake šume u zajedničkom šumskogospodarskom planu. Terenski rad odnosno prikupljanje podataka je nužno, međutim predstavlja financijski izdatak. Usporedimo li s metodološki tradicionalno izrađenim planovima gospodarenja šumama, broj potrebnih područja uzorkovanja je značajno manji. Dodatno, troškovi su niži kada više vlasnika odluči udružiti resurse u provođenju istraživanja. Za više pojedinosti o ovoj inovaciji kontaktirajte Francescu Giannetti (francesca.giannetti@unifi.it) ili posjetite web stranicu https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali

1.14. Mapping forest assortment at parcel level to support wood mobilization (English)

In GO-SURF, using a decision tree algorithm that uses as input data the growing stock map and forest types, the different wood assortments were calculated. This enables the creation of a map on which potential timber assortments are identified. The decision tree algorithm used the regional information on wood assortment to calculate the different assortment. The map is implemented in a decision support system and at the level of the forest parcel/stand, the map indicates the percentage of the volume of growing stock for each potential wood assortment, such as pellets, wood chips, firewood, poles and beams. This map is a valuable tool for forest managers in assessing the economic value of a forest before it is sold. The system is accessible via a simple polygon format on the user interface. Francesca Giannetti, francesca.giannetti@unifi.it

Kartiranje gozdnih sortimentov na ravni parcel za podporo mobilizaciji lesa (Slovenian)

V sistemu GO-SURF je bil z algoritmom odločitvenega drevesa, ki je kot vhodne podatke uporabil karto rastišč in gozdne tipe, izračunano različno lesno zalogo. To omogoča izdelavo zemljevida, na katerem so opredeljeni potencialni lesni sortimenti. Algoritem odločitvenega drevesa je za izračun različnih lesnih sortimentov uporabil regionalne podatke o lesnih sortimentih. Zemljevid je implementiran v sistem za podporo odločanju in na ravni gozdne parcele/stojišča prikazuje odstotek obsega rastoče zaloge za vsak potencialni lesni sortiment, kot so peleti, lesni sekanci, drva, drogovi in grede.Ta zemljevid je dragoceno orodje za upravljavce gozdov pri ocenjevanju gospodarske vrednosti gozda pred njegovo prodajo. Sistem je dostopen prek preproste poligonske oblike v uporabniškem vmesniku. Francesca Giannetti francesca.giannetti@unifi.it

1.15. Social network of sustainable forest use for the production of biomass for thermal purposes (English)

In Northern Spain, there are masses of trees with little commercial interest, currently unused, which increases the risk of fires and forest pests. It is necessary, therefore, to plan for the collaborative forest management and to use forest biomass for the circular economy beneficial for rural development (increase employment, reduce GHG emissions, minimize fire risks and forest pests). Both administrations and the general public must perceive the economic, social and environmental benefits of sustainable collaborative forest management. To this end, a social network for the use of forest biomass for thermal purposes is created. The social network improves forest management, thus eliminating excess fuel in the forest and using it for thermal purposes. The forest biomass exploitation networks are based on the ownership of the masses. Beyond the use of forest biomass for thermal purposes, the collaboratives also aim at increasing the resilience of forests through silvicultural treatments. As a result, external energy dependence is reduced and new jobs are created in the region, which in turn lowers the depopulation of the rural areas. It is especially an employment opportunity for young people and women to give greater viability to the territories as a whole.

Gemeinschaftliche Waldbewirtschaftung für die energetische Nutzung von forstlicher Biomasse (German)

In Nordspaniens gibt es große Mengen von Bäumen mit geringem wirtschaftlichem Nutzen. Wälder bleiben oft ungenutzt, was das Risiko von Waldbränden und Kalamitäten erhöht. Sinnvoll sind deshalb kooperative Waldbewirtschaftungsformen, die forstliche Biomasse für die Kreislaufwirtschaft nutzen und der Entwicklung ländlicher Räume zugutekommen (Zunahme an Arbeitsplätzen, Verringerung von Treibhausgasemissionen, Reduzierung von Waldbränden und Kalamitäten). Hierfür ist wichtig, dass bei Verwaltungen und Öffentlichkeit ein besseres Verständnis für die wirtschaftlichen, sozialen und ökologischen Vorteile einer gemeinschaftlichen Waldbewirtschaftung entsteht. Zu diesem Zweck wird ein soziales Netzwerk für die energetische Nutzung von forstlicher Biomasse eingerichtet. Das soziale Netzwerk verbessert die Waldbewirtschaftung, wodurch leicht brennbare Biomasse im Wald beseitigt und energetisch genutzt wird. Grundlegend für die gemeinschaftliche Zusammenarbeit sind die Eigentumsverhältnisse. Neben der energetischen Nutzung soll die Kooperation auch dazu beitragen, die Widerstandsfähigkeit der Wälder durch waldbauliche Maßnahmen zu erhöhen. Dadurch wird die Abhängigkeit von anderen Energiequellen verringert und es werden neue Arbeitsplätze in der Region geschaffen, was wiederum den Wegzug aus dem ländlichen Raum entgegenwirkt. Es ist besonders eine Beschäftigungsmöglichkeit für junge Menschen und Frauen, um die Lebensfähigkeit der Gebiete als Ganzes zu erhöhen.

1.16. "Innovation in products, processes and marketing to introduce local woods with special, greater value-added characteristics to the Catalan market (English)

OG SINGULARWOOD introduces innovation in products, processes and marketing in local woods with special, greater value-added characteristics to the Catalan market. The project aims to introduce a different concept to the formats of planks in standard dimensions available in large retail outlets, and to offer a product that has been minimally pre-processed and dried under ideal conditions to ensure optimal technological quality. The idea is to introduce this product to the retail market (wood craftsmen, cabinetmakers, carpenters, decorators, architects, surveyors, etc.), which has been identified as a "market niche". Through this project, the improvement of the economic results of forestry operations is expected, as well as the provision of the opportunity for forest owners to expand the range of added value in new markets (packaging and/or bioenergy). Furthermore, the improvement of the competitiveness for two groups of forest producers (Forestal de Catalunya, SCCL and Agrupació Forestal del Montnegre Corredor) through application of new processes for production of added value products for new local markets. The established "SingularWood" business initiative facilitates marketing and adds value to the woods from Catalonia's forests with special and unique features. More information can be found on FUSTES LOCALS - Posem en valor fusta de característiques especials i seva singulars (https://singularwood.cat/) website or through direct contact cooperativa@forestal.cat

Inovacije u proizvodima, procesima i marketingu za proizvode lokalnih šuma s posebnim karakteristikama, veće dodane vrijednosti na katalonsko tržište (Croatian)

Operativna skupina SINGULARWOOD uvodi inovacije u proizvode, procese i marketing proizvoda lokalnih šuma s posebnim karakteristikama i veće dodane vrijednosti na katalonsko tržište. Projekt ima za cilj uvesti drugačiji koncept u formate dasaka standardnih dimenzija, dostupnih u maloprodajnim objektima te ponuditi proizvod koji je prethodno minimalno obrađen i sušen u idealnim uvjetima, kako bi se osigurala optimalna tehnološka kvaliteta. Ideja je da se ovaj proizvod plasira na tržište maloprodajne (stolari, proizvođači namještaja, dekorateri, arhitekti, geodeti itd.), koje je identificirano kao „tržišna niša“. Kroz ovaj projekt očekuje se poboljšanje ekonomskih rezultata poslovanja sektora temeljenog na šumarstvu, kao i pružanje mogućnosti šumoposjednicima da prošire ponudu proizvoda dodane vrijednosti na novim tržištima (ambalaža i/ili bioenergija). Nadalje, poboljšanje konkurentnosti za dvije skupine proizvođača šuma (Forestal de Catalunya, SCCL i Agrupació Forestal del Montnegre Corredor) kroz primjenu novih procesa za proizvodnju proizvoda dodane vrijednosti za nova lokalna tržišta. Uspostavljena poslovna inicijativa ""SingularWood"" provodi marketing aktivnosti i jača vrijednost drvnoj sirovini katalonskih šuma s posebnim i jedinstvenim karakteristikama. Više informacija možete pronaći na web stranici FUSTES LOCALS - Posem en valor fusta de característiques especials i seva singulars (https://singularwood.cat/) ili putem izravnog kontakta cooperativa@forestal.cat

1.17. Development of a prototype crosslaminated timber panel made from local timber to improve the construction of buildings in terms of sustainability (English)

OG was established to develop a prototype cross laminated timber panel made from local timber to improve the sustainability of buildings' construction. All efforts were focused on the assessmentthe of technological and economical feasibility of cross-laminated timber panels (CLT) production in Catalonia by using local timber. A prototype panel was manufactured in real industrial production conditions and enabled the measuring of the processing performance and the preparation of the wood (sanitisation, planning, drying), the quality of the manufactured product and its strength. Based on the technical results and the obtained economic and market information, the pros and cons were identified for the production of local timber CLT in Catalonia. In order to reach relevant data, the project analysed CLT manufacturing technologies, design procedures and building construction. Moreover, factories, CLT machining centres, adhesive producers and specialised industrial machinery manufacturers in Europe were visited. To find out more information about activities and results, contact grupboix@grupboix.com or visit the web site https://www.arescat.cat/es/2018/11/23/arescat-participa-en-lo-proyecto-desarrollo-de-un-panel-prototipo-de-madera-laminada-cruzada-con-madera-local-para-mejorar-la-construccion-de-edificios-en-temas-de-sostenibilidad/

Razvoj prototipa križno laminirane drvene ploče izrađene od lokalnog drva za poboljšanje održivosti zgrada (Croatian)

Operativna skupina je osnovana za razvoj prototipa križno lamelirane drvene ploče izrađene od lokalnog drva s ciljem poboljšanja održivosti konstrukcije zgrada. Projekt je osmišljen kako bi se procijenila tehnološka i ekonomska izvedivost proizvodnje križno lameliranih drvenih ploča (CLT) u Kataloniji uporabom lokalnog drva. Kako bi se utvrdila izvedivost proizvodnje, prototip panela je proizveden u uvjetima industrijske proizvodnje što je omogućilo mjerenje učinka obrade i pripreme drva (sanitarizacija, blanjanje, sušenje), kvalitete proizvedenog proizvoda i njegove čvrstoće. Na temelju tehničkih rezultata, zajedno s ekonomskim i tržišnim podacima, identificirani su čimbenici za i protiv proizvodnje CLT-a u Kataloniji s katalonskim drvom. Projekt je analizirao proizvodne tehnologije CLT-a, postupke projektiranja i konstrukciju zgrada. S ciljem što kvalitetnije analize, posjećene su tvornice, CLT obradni centri, proizvođači ljepila i specijalizirani proizvođači industrijskih strojeva u Europi. Za više informacija o aktivnostima i rezultatima kontaktirajte grupboix@grupboix.com ili posjetite web stranicu https://www.arescat.cat/es/2018/11/23/arescat-participa-en-lo-proyecto-desarrollo-de-un-panel-prototipo-de-madera-laminada-cruzada-con-madera-local-para-mejorar-la-construccion-de-edificios-en-temas-de-sostenibilidad/

1.18. Innovative management models to improve productivity in smallholder areas (English)

The atomization of land ownership and the need for a tool to facilitate the management of parcels requires the development of a digital tool to facilitate this management. The Smallholdings Management Platform proposes a range of innovative solutions, such as preliminary information on the characteristics of the plots in terms of their dendrometric potential and their production potential. The platform is an online tool designed to facilitate the management of agricultural and forestry plots and to help owners manage their land and connect with other owners with whom they wish to collaborate, whether by linking up or by buying, selling, exchanging or renting land. You can use this platform to manage your rustic plots, both agricultural and forestry land and network with other owners. The tool can analyse the inventory, stocks and profitability of the owner's holdings using tabular and geographic tools and display them in a map viewer. It promotes the exchange or swap of holdings, favouring collective management. Registers parcels. Provides information on fire risk and territorial zoning, and information on forest fire damage coverage. Information on hazard periods to regulate use and authorization applications. The user has access to cadastral parcels throughout Spain, to the publication service for parcels and to a geographical viewer with information about their parcel. roberto.rubio@cesefor.com, https://gestion.minifundio.es/

Inovativni modeli upravljanja za izboljšanje produktivnosti na območjih malih kmetov (Slovenian)

Zaradi atomizacije lastništva zemljišč in potrebe po orodju za lažje upravljanje parcel je treba razviti digitalno orodje, ki bo olajšalo to upravljanje. Platforma za upravljanje malih posestev predlaga vrsto inovativnih rešitev, kot so predhodne informacije o značilnostih parcel v smislu njihovih dendrometričnih možnosti in proizvodnega potenciala. Platforma je spletno orodje, namenjeno lažjemu upravljanju parcel, tako kmetijskih kot gozdnih, in pomaga njihovim lastnikom pri upravljanju njihovih zemljišč ter vzpostavljanju stikov z drugimi lastniki, s katerimi želijo sodelovati bodisi s povezovanjem bodisi z nakupom, prodajo, zamenjavo ali najemom zemljišč. Prek te platforme boste lahko upravljali svoje rustikalne parcele, tako kmetijske kot gozdne, ter povezovanje z drugimi lastniki. Orodje lahko izvede analizo popisa, zalog in donosnosti lastnikovih kmečkih gospodarstev s pomočjo tabelaričnih in geografskih orodij za vpogled v pregledovalnik zemljevidov. Spodbuja izmenjave ali zamenjavo posesti, ki daje prednost skupinskemu upravljanju. Registrira zemljiške parcele. Ponuja informacije o požarni ogroženosti in teritorialni razdelitvi območij. Informacije o kritju škode zaradi gozdnih požarov. Informacije o času nevarnosti z namenom urejanja uporabe in zahtevkov za dovoljenja. Uporabnik bo lahko dostopal do katastrskih parcel po vsej Španiji, do storitve za objave parcel ter do geografskega pregledovalnika z informacijami o svoji parceli. roberto.rubio@cesefor.com, https://gestion.minifundio.es/

1.19. Innovative management models to improve productivity in smallholder areas (English)

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1.20. Logging trailer - solution for efficient use of transportation resources of farmers out of agricultural season (English)

This OG has developed a versatile long logging trailer that is suitable for transporting long as well as short logs, thanks to adjustable bunks that can be moved closer to or away from the lifting crane as needed. Otherwise, crane cannot balance short logs and reach far end of the trailer. This innovation addresses another issue: the seasonal imbalance in transportation resources. In Latvia, the timber industry faces a 50% transportation capacity shortfall in winter, contrasting with a nearly 50% surplus in summer. OG's solution leverages the underutilized truck fleets of agricultural businesses during their off-season. Many agricultural trucks, equipped with dump trailers for autumn grain transport, sit idle for parts of the year or are occasionally used for hauling mineral materials for summer road projects. By attaching the logging trailer to these trucks, they can be repurposed for log transport in winter, optimizing their use year-round. The business model offers flexibility. For example, a forestry company could own the logging trailer and rent it out to address transportation shortages during peak demand periods. This approach not only maximizes the utility of existing vehicles but also provides a strategic advantage by aligning resource availability with seasonal demands. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/inovat%C4%ABvi-risin%C4%81jumi-lauksaimniec%C4%ABbas-un.html, guntars.reinfelds@selflogistic.lv, n.krumins@gmail.com "

Remolque forestal - solución para el uso eficiente de los recursos de transporte de los agricultores fuera de la temporada agrícola (Spanish)

Este OG ha desarrollado un versátil remolque para troncos largos que sirve tanto para transportar troncos largos como cortos, gracias a las literas ajustables que pueden acercarse o alejarse de la grúa elevadora según sea necesario. De lo contrario, la grúa no puede equilibrar los troncos cortos y llegar al extremo más alejado del remolque. Esta innovación aborda otro problema: el desequilibrio estacional de los recursos de transporte. En Letonia, la industria maderera se enfrenta a un déficit de capacidad de transporte del 50% en invierno, que contrasta con un superávit de casi el 50% en verano. La solución de OG aprovecha las flotas de camiones infrautilizadas de las empresas agrícolas durante su temporada baja. Muchos camiones agrícolas, equipados con remolques volquete para el transporte de grano en otoño, permanecen inactivos durante parte del año o se utilizan ocasionalmente para transportar materiales minerales para proyectos de carreteras en verano. Al acoplar el remolque maderero a estos camiones, pueden reutilizarse para el transporte de troncos en invierno, optimizando su uso durante todo el año. El modelo de negocio ofrece flexibilidad. Por ejemplo, una empresa forestal podría ser propietaria del remolque maderero y alquilarlo para hacer frente a la escasez de transporte durante los periodos de máxima demanda. Este enfoque no sólo maximiza la utilidad de los vehículos existentes, sino que también proporciona una ventaja estratégica al alinear la disponibilidad de recursos con las demandas estacionales. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/inovat%C4%ABvi-risin%C4%81jumi-lauksaimniec%C4%ABbas-un.html, guntars.reinfelds@selflogistic.lv, n.krumins@gmail.com

ITHub 2 – Adaptation to climate change (23 PAs)

2.1. Survey of atypical tree species in Normandy thought to be resistant to climate change (English)

As part of the OG RAISON project, an inventory of atypical tree species in Normandy was carried out. The aim was to study their behaviour in relation to the soil and climatic conditions. The final objective was to identify the best species able to adapt to climate change. Lists of potential substitute species were proposed for each forest region and each type of site. Between December 2019 and May 2021, 384 stands from the list of 500 stands of interest were inventoried. The individual results were systematically sent to the owners. The most frequently reported coniferous species in order of importance were maritime pine, Atlas cedar, western red cedar and evergreen sequoia. Sixteen other coniferous species were reported. The most frequently reported deciduous species by importance were Virginia tulip tree, Corsican alder, Nothofagus obliqua and downy oak. All age classes were represented for many species, but these are not balanced and may reflect the dynamics of species utilisation. For newly planted species, it is important to continue to monitor the growth of stands when they are young and to restart the planting of those that are no longer used or are used infrequently, in order to improve our knowledge of the behaviour of these species in their first years of life. Identifying these atypical tree species and experimenting with different management methods is a long-term project for the forest and requires long-term sources of funding to enable these stands to be monitored. More information: https://hautsdefrance-normandie.cnpf.fr/projet-raison, romain.mani@cnpf.fr

Raziskava netipičnih drevesnih vrst v Normandiji, ki naj bi bile odporne na podnebne spremembe (Slovenian)

V okviru projekta RAISON je bil opravljen popis sestojev netipičnih vrst, prisotnih v Normandiji. Cilj je bil preučiti njihovo obnašanje glede na tla in podnebne razmere. Končni cilj je bil določiti vrste, ki bi se lahko najbolje prilagodile podnebnim spremembam. Za vsako gozdno regijo in vsako vrsto rastišča so bili predlagani seznami potencialnih nadomestnih vrst. Med decembrom 2019 in majem 2021 je bilo popisanih 384 sestojev s seznama 500 zanimivih sestojev. Posamezni rezultati so bili sistematično poslani lastnikom. Najpogostejše prijavljene vrste iglavcev po pomembnosti so bile primorski bor, atlaska cedra, zahodna rdeča cedra in zimzelena sekvoja. Poročali so še o šestnajstih drugih vrstah iglavcev. Najpogostejše prijavljene vrste listavcev po pomembnosti so bile virginijski tulipan, korziška jelša, Nothofagus obliqua in puhasti hrast. Pri mnogih vrstah so bili zastopani vsi starostni razredi, vendar ti niso uravnoteženi in lahko odražajo dinamiko uporabe vrste. Pri novo posajenih vrstah je pomembno, da še naprej spremljamo rast sestojev, ko so mladi, in ponovno začnemo saditi tiste, ki se ne uporabljajo več ali se uporabljajo redko, da bi izboljšali naše znanje o obnašanju teh vrst v prvih letih njihovega življenja. Ugotavljanje teh netipičnih vrst in preizkušanje različnih načinov gospodarjenja sta dolgoročna projekta za gozdove in zahtevata dolgoročne vire financiranja, ki bodo omogočili spremljanje teh sestojev." https://hautsdefrance-normandie.cnpf.fr/projet-raison, romain.mani@cnpf.fr

2.2. Setting up innovative silviculture trials: planting on waterlogged soil (English)

One of the aims of the OG RAISON project is to identify the most favourable planting methods for the development of a productive forest stand on waterlogged soils. CETEF members have selected a plot in the commune of Saint-Gatien-des-bois to establish the experimentation on a 4.6 ha plot. The plot where the system is to be installed has already been cleared and in the summer of 2020 the existing ditches will be extensively cut and rehabilitated. Groundwater is out of the question due to waterlogging. The factors to be investigated are changes in the growth, form and general behaviour of the species. A comparative cost analysis of the individual methods is carried out. The height of all trees is measured at the time of installation. In the following three years, the following variables are measured: the condition of the trees, their height and the presence of phytosanitary problems. The above variables are then measured on at least 30 randomly or systematically selected trees. Before the first thinning, the above variables are measured on all trees. This experiment can serve as a reference protocol in the future to increase the number of experimental stands on waterlogged soils. The measured data will be used to evaluate the effects of the planting methods on the growth of the stands. The inclusion of this data in a database containing all such systems at the national level could allow more accurate comparisons. Testing the effects of different planting methods on the survival and productivity of tree species is a long-term project for the forest and requires long-term funding sources to monitor these stands. More information: https://hautsdefrance-normandie.cnpf.fr/projet-raison, romain.mani@cnpf.fr

Vzpostavitev inovativnih poskusov gojenja gozdov: sajenje na razmočenih tleh (Slovenian)

Cilj projekta RAISON je ugotoviti najugodnejšo(-e) metodo(-e) sajenja za razvoj proizvodnega gozdnega sestoja na razmočenih tleh. Člani skupine CETEF so izbrali posestvo v občini Saint-Gatien-des-bois za vzpostavitev sistema na 4,6 ha velikem zemljiščuParcele, na katerih bo nameščen sistem, so bile posekane, poleti 2020 je sledilo obsežno drobljenje in obnova obstoječih jarkov. Zaradi zamočvirjenosti tal podtalnica ne pride v poštev. Raziskovani dejavniki so spremembe v rasti, obliki in splošnem obnašanju vrste. Opravljena bo primerjalna analiza stroškov vsake metode. Ob namestitvi se izmeri višina vseh dreves. V naslednjih treh letih se merijo naslednje spremenljivke: stanje dreves, njihova višina in prisotnost fitosanitarnih težav. Nato se zgornje spremenljivke izmerijo na najmanj 30 naključno ali sistematično izbranih drevesih ter obseg. Pred prvim redčenjem se za vsa drevesa izmerijo zgoraj navedene spremenljivke. Ta poskus lahko v prihodnosti služil kot referenčni protokol za povečanje števila poskusnih rastišč na razmočenih tleh. Izmerjeni podatki bodo uporabljeni za oceno vpliva metod sajenja na rast sestoja. Vključitev teh podatkov v podatkovno zbirko, ki vsebuje vse tovrstne sisteme na nacionalni ravni, bi lahko omogočila natančnejše primerjave. Preizkušanje vpliva različnih načinov sajenja na preživetje in produktivnost drevesnih vrst je dolgoročni projekt za gozd in zahteva dolgoročne vire financiranja, ki bodo omogočili spremljanje teh sestojev. https://hautsdefrance-normandie.cnpf.fr/projet-raison, romain.mani@cnpf.fr

2.3. Chestnut forests management for quality products and promote C sequestration (English)

CASTANI-CO promotes chestnut cultivation as a natural system suitable for carbon sequestration and a productive source of high-quality food (both for nutrition and the environment). Chestnut cultivation is typical of the hilly mountain environment of Emilia-Romagna and is deeply rooted in the culture and tradition of these areas. The main objective of the project was to monitor the carbon footprint of the chestnut orchard, which includes an assessment of the organic carbon sequestered in the soil and in the plants in relation to the soil environment and the different management practises of the chestnut orchard. Monitoring was carried out through field observations, soil studies, sampling and chemical analysis in chestnut groves of the partner companies located in different soil environments. Finally, 'Guidelines for the optimal management of chestnut groves to achieve a quality product and favourable carbon sequestration' were defined and distributed. Contact: Solaria Anzilotti (solaria.anzilotti@unifi.it) Livia Antisari (livia.vittori@unibo.it), https://ec.europa.eu/eip/agriculture/en/find-connect/projects/castani-co-%E2%80%9Cil-sequestro-di-carbonio-nel-sistema.html

Gospodarjenje s kostanjevimi gozdovi za kakovostne proizvode in spodbujanje sekvestracije C (Slovenian)

CASTANI-CO spodbuja kostanjeve nasade kot polnaravni sistem, ki je primeren za zadrževanje ogljika in kot produktiven vir kakovostne hrane (prehranske in okoljske). Gojenje kostanja je značilno za hribovsko gorsko okolje Emilije-Romanje in ima globoke korenine v kulturi in tradiciji teh območij. Ima pomembno vlogo pri blaženju podnebnih sprememb. Glavni cilj projekta je bilo spremljanje ogljičnega odtisa kostanjevega nasada, ki vključuje oceno organskega ogljika, vezanega v tleh in rastlinah, odvisno od okolja tal in različnih praks upravljanja kostanjevega nasada. Spremljanje je potekalo s terenskimi opazovanji, študijami tal, vzorčenjem in kemičnimi analizami v kostanjevih nasadih partnerskih podjetij, ki se nahajajo v različnih talnih okoljih. Na koncu so bile opredeljene in razdeljene "smernice za najboljše upravljanje nasadov sadnega kostanja za pridobitev kakovostnega proizvoda in ugodno sekvestracijo ogljika". Solaria Anzilotti (solaria.anzilotti@unifi.it) Livia Antisari (livia.vittori@unibo.it), https://ec.europa.eu/eip/agriculture/en/find-connect/projects/castani-co-%E2%80%9Cil-sequestro-di-carbonio-nel-sistema.html

2.4. Educational module “foresters, it's your turn to play" (English)

Consultation among stakeholders in Normandy's five areas, under the Forestry Territory Charter (CFT), highlighted the necessity for coordinated action and transparency in forest management. EUROFORNORM aimed to establish a regional forest network, with a focus on climate change's impact on Normandy's forests. "Forestiers, à vous de jouer" (Foresters, it's your turn to play) serves as an educational tool, a board game designed to educate primary school students about forest management and climate change adaptation. The game, distributed to 200 schools in Normandy, complements other educational initiatives like the "1000 communes, la forêt fait école" program. Feedback from teachers using the game has been positive, emphasizing its engaging nature and rich educational content, enabling students to learn about forest management and climate change adaptation in Normandy's forests. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/euro-fornorm-14-50-61-emergence-et-animation-d%E2%80%99un.html, laure.ferrier@communesforestieres.org

Módulo educativo "silvicultores, é a vossa vez de jogar" (Portuguese)

A consulta entre as partes interessadas nas cinco áreas da Normandia, ao abrigo da Carta do Território Florestal (CFT), salientou a necessidade de uma ação coordenada e de transparência na gestão florestal. O EUROFORNORM tinha como objetivo estabelecer uma rede florestal regional, com destaque para o impacto das alterações climáticas nas florestas da Normandia. "Forestiers, à vous de jouer" é uma ferramenta educativa, um jogo de tabuleiro concebido para educar os alunos do ensino primário sobre a gestão florestal e a adaptação às alterações climáticas. O jogo, distribuído a 200 escolas na Normandia, complementa outras iniciativas educativas como o programa "1000 communes, la forêt fait école". O feedback dos professores que utilizam o jogo tem sido positivo, salientando a sua natureza cativante e o seu rico conteúdo educativo, que permite aos alunos aprenderem sobre a gestão florestal e a adaptação às alterações climáticas nas florestas da Normandia. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/euro-fornorm-14-50-61-emergence-et-animation-d%E2%80%99un.html, laure.ferrier@communesforestieres.org

2.5. Assisted tree migration (English)

OG FuturForEst initiated controlled experiments called "islands of the future," testing ten new tree species across 70 2-hectare plots in public and private forests. These species, comprising five hardwoods and five softwoods, were chosen for their potential to withstand current and future climate conditions while producing quality timber. A survey identified and characterized 75 plots based on exposure, altitude, and soil type, with consistent land preparation procedures across all plots. The planting phase, conducted from November 2020 to January 2023, involved clearing vegetation, fencing plots, and manually potting plants at a density of 2,000 plants per hectare. Additionally, a maintenance and monitoring guide was developed to assist owners and managers in overseeing plantation development in the initial years. This initiative aimed to enhance the understanding of new species' behavior and adaptability in diverse forest station contexts. The network of islands facilitates long-term testing, providing insights into suitable silvicultural practices and species compatibility with various forest conditions. Moreover, the project fostered collaboration among different stakeholders, streamlining seed supply, processing, and nursery production efforts. Challenges such as seed and plant supply shortages, stemming from factors like poor fruiting and geopolitical issues, were acknowledged. The establishment of partnerships and the identification of common challenges among Franco-Belgian forest management organizations contributed to advancing forestry knowledge and adaptation strategies in the face of climate change. Contact: laetitia.poffet@onf.fr

Migração Florestal Assistida (Portuguese)

A iniciativa OG FuturForEst lançou experiências controladas chamadas 'ilhas do futuro', testando dez novas espécies de árvores em 70 parcelas de 2 hectares em florestas públicas e privadas. Estas espécies, incluindo cinco folhosas e cinco resinosas, foram selecionadas pelo seu potencial de resistência às condições climáticas atuais e futuras e pela produção de madeira de qualidade. Um levantamento identificou e caracterizou 75 parcelas com base na exposição, altitude e tipo de solo, com procedimentos consistentes de preparação do terreno. A fase de plantação, realizada de novembro de 2020 a janeiro de 2023, incluiu limpeza da vegetação, vedação das parcelas e envasamento manual das plantas a uma densidade de 2000 por hectare. Foi desenvolvido um guia de manutenção e monitoramento para auxiliar proprietários e gestores no acompanhamento do desenvolvimento das plantações nos primeiros anos. A iniciativa visa melhorar a compreensão do comportamento e da adaptabilidade de novas espécies em diversos contextos de estações florestais. A rede de ilhas facilita testes a longo prazo, fornecendo informações sobre práticas silviculturais adequadas e compatibilidade das espécies com várias condições florestais. Além disso, promove a colaboração entre diferentes partes interessadas, racionalizando o fornecimento de sementes, processamento e esforços de produção de viveiros. Desafios reconhecidos incluem escassez de fornecimento de sementes e plantas devido a fraca frutificação e questões geopolíticas. Parcerias e identificação de desafios comuns entre organizações de gestão florestal franco-belgas contribuíram para avanços no conhecimento florestal e estratégias de adaptação às mudanças climáticas. laetitia.poffet@onf.fr

2.6. Valorisation of Aleppo pine (Pinus halepensis) forests regenerated after forest fires (English)

The group aims to **energetically utilize forest residues** from Aleppo pine clearings. These forests regenerate spontaneously after Mediterranean wildfires, necessitating clearings for mass resilience. Goals include economic improvement, ecological restoration, enhanced clearing to increase the resilience of the forest mass, reduced carbon footprint, biomass valorization, and assessing post-fire regeneration-phase Aleppo pine stands.

Main outcomes:

- Improvement of the economy process of exploiting regenerated Aleppo pine biomass: enhances exploitation efficiency, reduces work phases and resources required.

- Enhanced returns from regenerated post-pine fire carrasco mounts: promotes mass utilization, facilitates market opportunities, and enhances forest development post-thinning.

- Environmental forest improvement: lowers Aleppo pine densities, encourages undergrowth light entry, reduces fire risk, improves carbon balance by replacing fossil fuels with renewable alternatives.

- Improved rural environmental quality: enhances forest biodiversity, landscape quality, prevents fires, eliminates pests, and mitigates/adapts to climate change.

- Social enhancement for stakeholders: boosts forest management awareness, creates rural employment, and establishes a market with significant rural impact.

- Territorial improvement: fosters biomass-related activities, facilitates fossil fuel alternatives adoption, and promotes intersectoral relationships in forest exploitation and use.

Valorização das florestas de pinheiro de Alepo (Pinus halepensis) regeneradas após incêndios Florestais (Portuguese)

O grupo visa **usar os resíduos florestais** das clareiras de pinheiro de Alepo para energia após incêndios mediterrânicos. Os objectivos incluem a melhoria económica, o restauro ecológico, a melhoria da limpeza para aumentar a resiliência da massa florestal, a redução da pegada de carbono, a valorização da biomassa e a avaliação de povoamentos de pinheiro de Aleppo em fase de regeneração pós-incêndio.

Resultados:

- Aperfeiçoamento do processo econômico de exploração da biomassa de pinheiro de Aleppo regenerado: aumenta eficiência, reduz fases de trabalho e recursos.

- Melhoria dos rendimentos dos montes de carrasco regenerados: promove uso em massa, facilita mercado e melhora desenvolvimento florestal pós-desbaste.

- Aperfeiçoamento ambiental da floresta: reduz densidade do pinheiro, incentiva entrada de luz no sub-bosque, diminui risco de incêndio, melhora balanço de carbono com alternativas renováveis.

- Melhoria da qualidade ambiental rural: aumenta biodiversidade, qualidade paisagística, previne incêndios, elimina pragas e enfrenta mudanças climáticas.

- Aperfeiçoamento social para partes interessadas: aumenta conscientização sobre gestão florestal, gera emprego rural e estabelece mercado com impacto rural significativo.

- Aperfeiçoamento territorial: fomenta atividades ligadas à biomassa, facilita adoção de alternativas aos combustíveis fósseis e promove relações intersectoriais.

2.7. Course on GIS and Remote Sensing Data to monitor forest ecosystem (English)

To monitor stress and the impacts of climate change on forests, there is a need to enhance the technical analysis skills of individuals involved in sustainable forest management. In recent years, various tools like Sentinel-2 satellite imagery have allowed for almost continuous monitoring of such stress. However, technological progress has not led to a real change because many technicians do not know how to use analysis tools, even simple ones. In this context, within the GO-SURF project, it was decided to organize a tailored 24-hour course to teach forest management technicians how to use these tools and the related GIS (Geographic Information System) tools for analysis. The course has been highly successful with over 50 participants enrolled. The course was structured with practical exercises conducted in classroom settings tailored to the forestry sector. In particular, the Google Earth Engine analysis platform and data easily implementable into the QGIS system were used. This enabled the transfer of analytical capabilities to the technicians who attended the course, many of whom had no prior knowledge of the potential of these tools. The technicians emphasized that courses of this kind are crucial, especially in a forestry context. The strength of the course lay in its practical aspect, with exercises specifically designed to address forestry-related scenarios. Contact: francesca.giannetti@unifi.it

Curso sobre SIG e dados de deteção remota para monitorizar o ecossistema florestal (Portuguese)

Para monitorizar o stress e os impactos das alterações climáticas nas florestas, é necessário melhorar as competências técnicas de análise dos indivíduos envolvidos na gestão sustentável das florestas. Nos últimos anos, várias ferramentas, como as imagens de satélite Sentinel-2, permitiram um acompanhamento quase contínuo desse stress. No entanto, o progresso tecnológico não conduziu a uma mudança efectiva porque muitos técnicos não sabem utilizar ferramentas de análise, mesmo simples. Neste contexto, no âmbito do projeto GO-SURF, foi decidido organizar um curso personalizado de 24 horas para ensinar os técnicos de gestão florestal a utilizar estas ferramentas e as ferramentas SIG (Sistema de Informação Geográfica) relacionadas para análise. O curso foi muito bem sucedido, com mais de 50 participantes inscritos. O curso foi estruturado com exercícios práticos realizados em salas de aula adaptadas ao sector florestal. Em particular, foi utilizada a plataforma de análise Google Earth Engine e dados facilmente implementáveis no sistema QGIS. Este facto permitiu a transferência de capacidades analíticas para os técnicos que participaram no curso, muitos dos quais não tinham conhecimento prévio do potencial destas ferramentas. Os técnicos sublinharam que este tipo de formação é fundamental, sobretudo num contexto florestal. A força do curso reside na sua vertente prática, com exercícios especificamente concebidos para abordar cenários relacionados com a floresta. Contacto: francesca.giannetti@unifi.it

2.8. Evaluation of different microclimatic conditions in a linear planting with rows of hybrid biomass poplars combined with maize (English)

Extreme weather conditions are strongly influencing the agriculture and agroforestry sectors, which consequently increases the importance of new innovative solutions to mitigate that impact. Hence, the OG NEWTON - Agroforestry Network in Tuscany evaluated different microclimatic conditions in a linear planting with rows of hybrid biomass poplars combined with maize with the aim to promote agroforestry practices in Tuscany as a strategy for the sustainable agricultural intensification supporting the economic and environmental sustainability. Linear planting with rows of hybrid biomass poplar trees associated with maize was used to evaluate the effect of microclimatic conditions on the crop's water status and production. OG dedicated efforts analyse the potential of cropping systems to mitigate the climate change impact. Implemented process innovation resulted with very interesting data on numerous factors which you can find out here https://gonewton.it/. But if you want to learn more about this amazing work done by the OG NEWTON, please contact azienda@tenutadipaganico.it

Procjena različitih mikroklimatskih uvjeta u linearnoj sadnji topole za hibridnu biomasu u kombinaciji s kukuruzom (Croatian)

Ekstremni vremenski uvjeti snažno utječu na sektore poljoprivrede i agrošumarstva, što posljedično povećava važnost novih inovativnih rješenja za ublažavanje tog utjecaja. Stoga je operativna skupina NEWTON - Agrošumarska mreža u Toskani odlučila izvršiti procjenu različitih mikroklimatskih uvjeta u linearnoj sadnji topole za hibridnu biomasu u kombinaciji s kukuruzom. Navedeno istraživanje provedeno je s ciljem promicanja agrošumarske prakse u Toskani kao strategije za održivo intenziviranje poljoprivrede koje obuhvaća ekonomsku i ekološku održivost. Linearna sadnja stabala topole za hibridnu biomasu i kukuruza, korištena je za procjenu učinka mikroklimatskih uvjeta na stanje vode usjeva i proizvodnju. Operativna skupina je uloženi naporima analizirala potencijal sustava uzgoja usjeva za ublažavanje utjecaja klimatskih promjena. Provedena inovacija procesa rezultirala je vrlo zanimljivim podacima o brojnim čimbenicima koje možete pronaći ovdje https://gonewton.it/. Ali ako želite saznati više o iznimnom radu operativne skupine NEWTON, kontaktirajte azienda@tenutadipaganico.it

2.9. Application of SlideforMap for the hydrological risk assessment in sustainable managed forests (English)

The SlideforMAP model, developed by ecorisQ, assesses the probability of shallow landslides triggered by rainfall on a regional scale, incorporating forest data for root reinforcement calculations. In the BIOSEIFORTE project, this model was used to evaluate the impact of land cover changes on slope stability in the Mt. Nerone area and to analyze current conditions during extreme rainfall events. The analysis emphasized the critical role of forests in stabilizing slopes through root reinforcement, particularly highlighting how increased forest cover has significantly reduced landslide susceptibility in vulnerable areas. By quantifying forests' contribution to slope stability, SlideforMAP provides essential insights for research and practical applications, aiding in understanding how environmental factors influence landslide dynamics at a regional level. This tool is crucial for guiding land use planning and offering quantitative information on an area's stability conditions. However, obtaining detailed data like accurate terrain models remains a challenge but is essential for enhancing the accuracy and effectiveness of slope stability assessments. Web: https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversita-e-servizi-ecosistemici-foreste-e-territorio. Contact info: Solaria.anzilotti@unifi.it

Aplicación SlideforMap para la evaluación del riesgo hidrológico en bosques gestionados de forma sostenible (Spanish)

El modelo SlideforMAP, desarrollado por ecorisQ, evalúa la probabilidad de deslizamientos poco profundos desencadenados por las precipitaciones a escala regional, incorporando datos forestales para el cálculo del refuerzo de las raíces. En el proyecto BIOSEIFORTE, este modelo se utilizó para evaluar el impacto de los cambios en la cubierta terrestre sobre la estabilidad de los taludes en la zona del monte Nerone y para analizar las condiciones actuales durante episodios de precipitaciones extremas. El análisis puso de relieve el papel fundamental de los bosques en la estabilización de las laderas mediante el refuerzo de las raíces, destacando en particular cómo el aumento de la cubierta forestal ha reducido significativamente la susceptibilidad a los corrimientos de tierras en zonas vulnerables. Al cuantificar la contribución de los bosques a la estabilidad de las laderas, SlideforMAP proporciona información esencial para la investigación y las aplicaciones prácticas, ayudando a comprender cómo influyen los factores medioambientales en la dinámica de los corrimientos de tierras a escala regional. Esta herramienta es crucial para orientar la planificación del uso del suelo y ofrecer información cuantitativa sobre las condiciones de estabilidad de una zona. Sin embargo, la obtención de datos detallados, como modelos precisos del terreno, sigue siendo un reto, pero resulta esencial para mejorar la precisión y eficacia de las evaluaciones de la estabilidad de las laderas. Web: https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversita-e-servizi-ecosistemici-foreste-e-territorio. Información de contacto: Solaria.anzilotti@unifi.it

2.10. Management manual for stone pine (English)

The management of stone pine forests faces important challenges and threats, including biotic and abiotic factors. The aim of OG PINEA (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/mejoras-e-innovaci%C3%B3n-en-la-producci%C3%B3n-de-pi%C3%B1%C3%B3n.html) in Spain is to provide forest management guidelines for natural stands and plantations already in production and for the installation of new stands with suitable conditions, with the objective of maintaining and improving pine nut production and contributing to the development of its value chain. 3 typologies of pine cone stands and plantations were defined. This manual has a didactic and introductory function to inform practitioners about the management of stone pine stands, whether they come from plantations or natural stands. Each stand has particular conditions in which its management will depend on the objective of the stand and its conditioning factors, so it is advisable to contact forestry engineers who are experts in stone pine silviculture so that they can carry out a study and/or give advice for the specific case of the stand in question. This work is a first step to assess in a quantifiable way the interest of recovering production in non- or poorly managed P. pinea plantations. The work will have to be continued for at least two more seasons. Contact: montse.ganado@cesefor.com

Manuel de gestion du pin parasol (French)

La gestion des forêts de pins parasols est confrontée à d'importants défis et menaces, notamment des facteurs biotiques et abiotiques. L'objectif du GO PINEA en Espagne (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/mejoras-e-innovaci%C3%B3n-en-la-producci%C3%B3n-de-pi%C3%B1%C3%B3n.html) est de fournir des lignes directrices en matière de gestion des peuplements naturels et plantations déjà en production, et pour l'installation de nouveaux peuplements dans le but de maintenir et d'améliorer la production de pignons et de contribuer au développement de sa chaîne de valeur. 3 typologies de peuplements et plantations de pin ont été définies. Ce manuel a une fonction didactique et introductive pour informer les praticiens sur la gestion des peuplements de pins parasols, qu'ils soient issus de plantations ou de peuplements naturels. Chaque peuplement présente des conditions particulières dans lesquelles sa gestion dépendra de l'objectif du peuplement et de ses facteurs de conditionnement, il est donc conseillé de faire appel à des ingénieurs forestiers experts en sylviculture du pin parasol afin qu'ils réalisent une étude et/ou donnent des conseils spécifiques. Ce travail constitue une première étape pour évaluer de manière quantifiable l'intérêt de relancer la production dans les plantations de P. Pinea non ou mal gérées. Les travaux devront se poursuivre pendant au moins 2 saisons supplémentaires. Contact : montse.ganado@cesefor.com

2.11. Decline of Cork Oak Forests (English)

The OG GO GEOSUBER: The cork oak, managed in agroforestry systems such as the "Montado" or "Dehesa", produces several products and services essential for landscapes, environments, and economies. However, challenges such as climate change, pests, diseases, and poor management practices threaten its vitality and distribution. Addressing these issues requires resilient approaches and transitioning to ecosystems adapted to future conditions. Forest policies and management should prioritize maintaining ecological functions, promoting genetic diversity, and improving ecosystem fitness. Recommended management practices include reducing the impact of operations and climate change on soil and nutrient cycles, promoting natural regeneration, or utilizing plants adapted to harsher environments, reducing stand density, and promoting heterogeneity. Additionally, studying cork oak growth and survival in different regions is crucial for informed decision-making in planting efforts. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/geo-suber-monitoriza%C3%A7%C3%A3o-do-montado.html, contact: mcssilva@unac.pt

Declínio dos montados de Sobro (Portuguese)

A OG GO GEOSUBER: O sobreiro, gerido em sistemas agroflorestais como o "Montado" ou "Dehesa", produz vários produtos e serviços essenciais para paisagens, ambientes e economias. No entanto, desafios como as alterações climáticas, pragas, doenças e más práticas de gestão ameaçam a sua vitalidade e distribuição. Abordar estas questões requer abordagens resilientes e a transição para ecossistemas adaptados a condições futuras. As políticas florestais e a gestão devem priorizar a manutenção das funções ecológicas, a promoção da diversidade genética e a melhoria da aptidão do ecossistema. As práticas de gestão recomendadas incluem a redução do impacto das operações e das mudanças climáticas no solo e no ciclo dos nutrientes, a promoção da regeneração natural ou, utilização de plantas adaptadas a ambientes mais hostis e a redução da densidade do povoamento e a promoção da heterogeneidade. Além disso, o estudo do crescimento e sobrevivência do sobreiro em diferentes regiões é crucial para tomadas de decisão informadas nos esforços de plantação. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/geo-suber-monitoriza%C3%A7%C3%A3o-do-montado.html, contacto: mcssilva@unac.pt

2.12. Geosuber Tool (English)

The OG GO GEOSUBER: The project has developed an online tool to identify dead cork oaks using satellite images, crucial for fulfilling bureaucratic procedures in Portugal. It has been proven that the secondary growth of the tree begins with the blooming of new leaves. With this statement, we can hypothesize that cork cambium also begins its activity at the same time. Water availability is the factor determining the duration of time when secondary growth is active. The model created detected tree vitality with accuracy ranging from 85% to 70%, with better accuracy in September and October. The further development of the tool for practical use is recommended, as it can provide forest owners with vital information about the health of their properties and facilitate forest management adapted to climate change, as well as requiring specific calibration for each study area. This tool has huge potential in Portugal, as identifying the location of dead cork oaks is necessary to fill out the necessary documentation for cutting down dead cork oaks. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/geo-suber-monitoriza%C3%A7%C3%A3o-do-montado.html, contact: mcssilva@unac.pt

Ferramenta Geosuber (Portuguese)

A OG GO GEOSUBER: O projeto desenvolveu uma ferramenta online para identificar sobreiros mortos usando imagens de satélite, crucial para cumprir procedimentos burocráticos em Portugal. Foi provado que o crescimento secundário da árvore começou com o desabrochar das novas folhas. Com esta afirmação, podemos hipotetizar que o câmbio de cortiça também começa a sua atividade ao mesmo tempo. A disponibilidade de água é o fator que determina a duração do tempo em que o crescimento secundário está ativo. O modelo criado detetou a vitalidade das árvores com precisão entre 85% a 70%, com melhor precisão em setembro e outubro. Recomenda-se a continuação do desenvolvimento da ferramenta para uso prático, pois pode fornecer aos proprietários florestais informações vitais sobre a saúde de suas propriedades e facilitar a gestão florestal adaptada às mudanças climáticas, além de necessitar de uma calibração específica para cada área de estudo. Esta ferramenta tem um enorme potencial em Portugal, uma vez que identificar a localização de sobreiros mortos é necessário para preencher a documentação necessária para cortar sobreiros mortos. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/geo-suber-monitoriza%C3%A7%C3%A3o-do-montado.html, contacto: mcssilva@unac.pt

2.13. Precision fertilization of Cork Oak (English)

OG GO REGACORK: The project aimed to investigate the application of irrigation and fertilization techniques in cork oak plantations, focusing on reducing tree mortality and increasing cork production. Careful irrigation use is recommended, prioritizing locations with easy access to water. The drip irrigation system is preferred, especially in new plantations, due to its efficiency in water resource utilization. The suggested plantation density varies between 625 and 1111 trees per hectare, depending on site conditions. It is crucial to install the irrigation system before planting and select young plants with well-developed roots. Fertilization should be applied at the end of irrigation to maximize nutrient absorption by plants. Continuously monitoring soil moisture is essential for adjusting the frequency and amount of irrigation. The results showed a significant increase in tree diameter and cork production in irrigated trees, as well as a reduction in the time required (8 instead of the usual 12 years) for the first cork extraction. These findings underscore the importance of fertilization and irrigation in optimizing cork oak growth and quality, contributing to the sustainability and profitability of plantations. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/rega-de-precis%C3%A3o-de-sobreiros-em-modo-de-produ%C3%A7%C3%A3o.html, contact: goregacork@uevora.pt

Precisão da fertilização em montado de Sobro (Portuguese)

A OG GO REGACORK (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/rega-de-precis%C3%A3o-de-sobreiros-em-modo-de-produ%C3%A7%C3%A3o.html): O projeto teve como objetivo investigar a aplicação de técnicas de irrigação e fertilização em plantações de sobreiros, com foco na redução da mortalidade das árvores e no aumento da produção de cortiça. Recomenda-se a utilização criteriosa da irrigação, priorizando locais com fácil acesso à água. O sistema de rega gota-a-gota é preferido, especialmente em plantações novas, devido à sua eficiência na utilização de recursos hídricos. A densidade da plantação sugerida varia entre 625 e 1111 árvores por hectare, dependendo das condições do local. É crucial instalar o sistema de irrigação antes da plantação e escolher plantas jovens com raízes bem desenvolvidas. A fertilização deve ser aplicada no final da irrigação para maximizar a absorção de nutrientes pelas plantas. Monitorar continuamente a humidade do solo é essencial para ajustar a frequência e a quantidade de irrigação. Os resultados demonstraram um aumento significativo no diâmetro e na produção de cortiça das árvores submetidas à irrigação, além de uma redução no tempo necessário (8 invés dos 12 normais) para o primeiro descortiçamento. Essas descobertas ressaltam a importância da fertilização e irrigação na otimização do crescimento e na qualidade da cortiça dos sobreiros, contribuindo para a sustentabilidade e rentabilidade das plantações. Contacto: goregacork@uevora.pt

2.14. "New" pruning method for fertigated Cork Oak (English)

The OG GO REGACORK: Irrigation and fertilization of plants during the dry season led to an increased growth rate and the creation of a greater number of branches on the tree trunk. Under normal conditions, trees are pruned with the aim of creating better conditions for cork and acorn production, also allowing more sunlight to reach the ground, making it available for agricultural or livestock activities, and creating a tree with a single trunk, few branches, and, most of the time, with 2, 3, or 4 branches, evenly spaced, between the height of 2 and 3 meters. In the REGASUBER case study, the pruning applied was like that carried out on high-quality timber trees, prioritizing the formation of a single straight trunk, without branches, and leaving most of the branches that are in the horizontal position, cutting any branch inserted into the main trunk at an acute angle. Another issue to consider when pruning cork oaks in irrigation and fertilization systems is that the operation needs to be carried out annually to ensure that the tree trunks maintain a good shape. The results are not yet fully understood, as the trees have not reached adulthood, but it is expected that the trees will grow taller, the trunk diameter will be larger, and with a straight shape. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/rega-de-precis%C3%A3o-de-sobreiros-em-modo-de-produ%C3%A7%C3%A3o.html, contact: goregacork@uevora.pt

“Novo” método de poda para sobreiros fertirrigados (Portuguese)

A OG GO REGACORK: A irrigação e fertilização das plantas durante a estação seca leva a uma taxa de crescimento aumentada e à criação de um maior número de ramos no tronco das árvores. Em condições normais, as árvores são podadas com o objetivo de criar melhores condições para a produção de cortiça e bolotas, permitindo também que mais luz solar alcance o solo, tornando-o disponível para atividades agrícolas ou pecuárias, e criando uma árvore com um único tronco, poucos ramos e, na maioria das vezes, com 2, 3 ou 4 ramificações, espaçadas uniformemente, entre a altura de 2 e 3 metros. No estudo de caso REGASUBER, a poda aplicada foi semelhante ao realizado em árvores de madeira de alta qualidade, priorizando a formação de um único tronco reto, sem ramificações, e deixando a maioria dos ramos que estão na posição horizontal, cortando qualquer ramo inserido no tronco principal com um ângulo agudo. Outra questão a ser considerada ao podar sobreiros em sistemas de irrigação e fertilização é que é necessário realizar a operação anualmente para garantir que os troncos das árvores mantenham uma boa forma. Os resultados ainda não são totalmente compreendidos, uma vez que as árvores não atingiram a idade adulta, mas espera-se que as árvores cresçam mais altas, o diâmetro do tronco seja maior e com uma forma reta. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/rega-de-precis%C3%A3o-de-sobreiros-em-modo-de-produ%C3%A7%C3%A3o.html, contacto: goregacork@uevora.pt

2.15. Increase producers' knowledge about precision fertigation of Cork Oaks (English)

The OG GO REGACORK: Cork production has been declining in quantity and quality over the last decades due to inadequate management practices, biotic factors, and more severe climatic conditions. This project aimed to study fertigation in cork oak forests to increase the profit of stakeholders and create a simple guide for landowners to follow. The results were compiled into chapters available online and in print and later distributed free of charge to forest owner associations and various related entities, allowing the information to reach landowners. It was a rich experience in knowledge sharing, as different companies, institutions, and landowners were involved in this project. Connections and communication among the different stakeholders were key factors in the success of this project. All results from the various case studies led to the creation of different scientific articles, thus sharing the findings with the academic and scientific community. The creation of manuals, easily accessible to landowners, allowed them to replicate the experiments and see the results for themselves under different plantation and location conditions. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/rega-de-precis%C3%A3o-de-sobreiros-em-modo-de-produ%C3%A7%C3%A3o.html, contact: goregacork@uevora.pt

Aumentar o conhecimento dos proprietários sobre a fertirrigação dos montados de Sobro (Portuguese)

A OG GO REGACORK: A produção de cortiça nas últimas décadas tem diminuído em quantidade e qualidade, devido a práticas de gestão inadequadas, fatores bióticos e condições climáticas mais severas. Este projeto teve como objetivo o estudo da fertirrigação em montados de sobro, para aumentar o lucro dos intervenientes e criar um guia simples para os proprietários poderem seguir. Os resultados foram reunidos em capítulos disponíveis online e impressos e, posteriormente, distribuídos gratuitamente às associações de proprietários florestais e diversas entidades relacionadas, o que permitiu que a informação chegasse aos proprietários. Foi uma experiência rica na partilha de conhecimento, pois diferentes empresas, instituições e proprietários estiveram envolvidos neste projeto. As conexões e comunicação entre as diferentes partes interessadas foram um dos principais fatores para o sucesso deste projeto. Todos os resultados dos diferentes estudos de caso permitiram a criação de diferentes artigos científicos, compartilhando assim os resultados com a comunidade académica e científica. E a criação de manuais, facilmente disponíveis para os proprietários de terras, que lhes permitem recriar as experiências e ver por si próprios os resultados em diferentes condições de povoamento e local. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/rega-de-precis%C3%A3o-de-sobreiros-em-modo-de-produ%C3%A7%C3%A3o.html,
contacto: goregacork@uevora.pt

2.16. Good practices for the management of pests in Stone Pine (Pinus pinea L.) I (English)

Operational Group +PINHÃO aimed to develop diagnostic and monitoring processes for determining the impact of pests on the production of pine cones and pine nuts, with emphasis on the pine cone sucker (Leptoglossus occidentalis) as the basis for the integrated management of the biotic agents associated with pine nut production losses. The objective of this project was to identify the biotic entities (pests and diseases) that affect the development of the plants and the pine nut production, describing the ways to detect them, and which management practices could be applied for their control. OG members identified three major pests (Western conifer seed bug (Leptoglossus occidentalis H.); Pine cone moth (Dioryctria mendacella S.); Pine cone weevil (Pissodes validirostris S.)) and developed the pest control methods for each entity. More details are available on https://www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/pinhao or by contacting mrbranco@isa.ulisboa.pt

Primjer dobre prakse u suzbijanju štetnika bora (Pinus pinea L.) (Croatian)

Operativna skupina +PINHÃO imala je za cilj razviti dijagnostičke i nadzorne procese za određivanje utjecaja štetnika na proizvodnju češera i pinjola, s naglaskom na stjenicu borovih češera (Leptoglossus occidentalis). Predmetni procesi su osnova za integrirano upravljanje biotičkim agensima povezanim s gubicima u proizvodnji pinjola. Cilj ovog projekta bio je identificirati biotičke entitete (štetočine i bolesti) koji utječu na razvoj biljaka i proizvodnju pinjola, opisati načine njihovog otkrivanja i metode upravljanja koje bi se mogle primijeniti za njihovu kontrolu. Članovi operativne skušine su identificirali tri glavna štetnika Leptoglossus occidentalis H., Dioryctria mendacella S., Pissodes validirostris S. i razvili metode kontrole za svaku vrstu štetnika. Više detalja dostupno je na https://www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/pinhao ili slanjem upita na mrbranco@isa.ulisboa.pt

2.17. Good practices for the management of diseases in Stone Pine (Pinus pinea L.) II (English)

Forest producers and industries in Portugal are concerned about losses in pine nut production due to biotic agents such as Leptoglossus occidentalis, the pine cone weevil, and the pine cone moth. This project aims to develop integrated management processes to control these damages and minimize losses. Activities include determining the level of damage, identifying flowering stages associated with pests, selecting bioactive compounds, developing traps and attractants, evaluating silvicultural management, and testing beneficial insects. The project dissemination will be carried out through various means such as workshops, conferences, demonstration units, and technical materials. For more information, you can consult the following link: https://www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/pinhao

Buenas prácticas para el manejo de enfermedades en el Pino Piñonero (Pinus pinea L.) II (Spanish)

Los productores e industriales forestales en Portugal están preocupados por las pérdidas en la producción de piñones debido a agentes bióticos como Leptoglossus occidentalis, el gorgojo del cono de pino y la polilla del cono de pino. Este proyecto busca desarrollar procesos de gestión integrada para controlar estos daños y minimizar las pérdidas. Se incluyen actividades como la determinación del nivel de daño, identificación de etapas de floración asociadas con plagas, selección de compuestos bioactivos, desarrollo de trampas y atrayentes, evaluación del manejo silvícola y pruebas con insectos beneficiosos. La difusión del proyecto se realizará a través de varios medios, como talleres, congresos, unidades de demostración y materiales técnicos. Para más información podéis consultar el siguiente enlace: https://www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/pinhao

2.18. Increase and transfer the knowledge to producers about good practices for the management of pests and diseases in Stone Pine (Pinus pinea L.) (English)

The main objective of the innovation is to develop diagnostic and monitoring processes to assess the impact of pests, especially Leptoglossus occidentalis, on pine cone and pine nut production. Expected results include characterizing regional production cycles, quantifying pest damage, identifying vulnerable phenological stages and beneficial biotic agents, as well as developing prevention and control strategies. Preliminary results reveal the presence of fungi such as Diplodia sapinea and Sydowia polyspora in both mature and immature pine cones, with indications of early infection by Sydowia polyspora in the pine's phenological cycle. However, the complete dynamics of these diseases will require additional evaluations. For more information, you can consult the following link: https://www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/pinhao

Aumentar y transferir el conocimiento a los productores sobre las buenas prácticas para el manejo de plagas y enfermedades en el Pino Piñonero (Spanish)

El objetivo principal de la innovación es desarrollar procesos de diagnóstico y monitoreo para evaluar el impacto de las plagas, especialmente Leptoglossus occidentalis, en la producción de piñas y piñones. Los resultados esperados incluyen la caracterización de los ciclos de producción regional, la cuantificación de daños por plagas, la identificación de estadios fenológicos vulnerables y de agentes bióticos auxiliares, así como el desarrollo de estrategias de prevención y control. Los resultados preliminares revelan la presencia de hongos como Diplodia sapinea y Sydowia polyspora en piñas maduras e inmaduras, con indicios de infección temprana por Sydowia polyspora en el ciclo fenológico del pino. Sin embargo, la dinámica completa de estas enfermedades requerirá evaluaciones adicionales. Para más información podéis consultar el siguiente enlace: https://www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/pinhao

2.19. Identifying the presence of Flathead Oak Borer (Coroebus undatus F.) in Cork Oak (Quercus suber L.) (English)

UNDERCORK is an operational group dedicated to the integrated management of the oak borer developing a strategy to detect, monitor and control the attack of Coroebus undatus F. This species attacks various deciduous trees such as Quercus spp. (oak), Fagus sylvatica L. (European beech), Castanea sativa M. (chestnut) and Corylus avellana L. (hazel), which indicates the importance of project activities. Through the project activities, damage, signs and symptoms of the presence of this insect were identified, before and after the attack, which helped clarify some of the knowledge that forest workers and landowners previously had about this species. It is very difficult to know whether a tree is attacked or not, so some techniques have been tested and the results are as follows:

- the method without harmful effects included the application of an acoustic detector tool; however, very poor results were achieved. The reason for this was that in field tests the tool did not detect a very low noise level, due to the small size of the larvae and their low activity in combination with the excellent sound insulation properties of cork.

- cork sampling is the second tested method that gave the best results. This technique is proposed to monitor the presence and intensity of attacks in the forest.

You can find more information at www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/undercork, or by contacting mcssilva@unac.pt

Utvrđivanje prisustva plosnatog hrastovog svrdlaša (Coroebus undatus F.) u hrastu plutnjaku (Quercus suber L.) (Croatian)

UNDERCORK je operativna skupina posvećena integriranom upravljanju hrastovim svrdlašem koja razvija strategiju za otkrivanje, praćenje i kontrolu napada Coroebus undatus F. Ova vrsta napada različito lisnato drveće poput Quercus spp. (hrast), Fagus sylvatica L. (Europska bukva), Castanea sativa M. (kesten) i Corylus avellana L. (lijeska) što ukazuje na važnost projektnih aktivnosti. Kroz projektne aktivnosti su identificirane štete, znakovi i simptomi prisutnosti ovog kukca, prije i poslije napada, što je pomoglo u razjašnjavanju nekih saznanja koja su šumski radnici i zemljoposjednici prethodno imali o ovoj vrsti. Vrlo je teško znati je li stablo napadnuto ili ne, stoga su testirane neke tehnike, a rezultati su sljedeći:

- metoda bez štetnih učinaka obuhvatila je primjenu akustičkog detektorskog alata; međutim, ostvareni su vrlo slabi rezultati. Razlog tome bio je taj što je u terenskim ispitivanjima alat nije detektirao vrlo nisku razinu buke, zbog male veličine ličinki i njihove niske aktivnosti u kombinaciji s izvrsnim svojstvima zvučne izolacije pluta.

- uzorkovanje pluta je druga testirana metoda koja je dala najbolje rezultate. Ova tehnika se predlaže za praćenje prisutnosti i intenziteta napada u šumi.

Više informacija možete pronaći na www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/undercork ili kontaktiranjem na mcssilva@unac.pt

2.20. Monitoring the population of Flathead Oak Borer (Coroebus undatus F.) in Cork Oak (Quercus suber L.) (English)

The GO UNDERCORK is the operational Group for the integrated management of Flathead Oak Borer encompassing the development of strategies to detect, monitor, and control the attacks of Coroebus undatus F. This species attacks many different broadleaf trees, such as Quercus spp. (Oaks), Fagus sylvatica L. (European beech), Castanea sativa M. (Chestnut) and Corylus avellana L. (Common hazel) which implies the importance of project activities.

The work identified the damage, signs and symptoms expected from this insect presence, before and after the attacks. Clarifying some common knowledge forest workers and landowners previously had about this specie. It is very hard to know if the tree is being attacked or not and some techniques were tested, and the results are the following:

- an acoustic detection tool was used as a non-destructive method; however, the results showed a low success. The reason for this was, that in field trials very low noise or no noise at all was not detected by the tool, the suggested explanation was the tiny size of the larvae and its low activity in conjunction with the great soundproof qualities of the cork.

- sampling of the cork was another tested method tested that gave the best results. This technique is the one suggested to be used to monitor the presence and intensity of attacks in the forest.

More information can be found www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/undercork or by contacting mcssilva@unac.pt

Monitoring populacije hrastovog svrdlaša (Coroebus undatus F.) u šumi hrasta plutnjaka (Quercus suber L.) (Croatian)

UNDERCORK je operativna skupina posvećena integriranom upravljanju hrastovim svrdlašem koja razvija strategiju za otkrivanje, praćenje i kontrolu napada Coroebus undatus F. Ova invazivna vrsta napada različito lisnato drveće poput Quercus spp. (hrast), Fagus sylvatica L. (Europska bukva), Castanea sativa M. (kesten) i Corylus avellana L. (lijeska) što ukazuje na važnost projektnih aktivnosti. Projekt je identificirao štete, znakovi i simptomi prisutnosti ovog kukca, prije i poslije napada, što je pomoglo u razjašnjavanju nekih saznanja koja su šumski radnici i zemljoposjednici prethodno imali o ovoj vrsti. Vrlo je teško znati je li stablo napadnuto ili ne, stoga su testirane neke tehnike, a rezultati su sljedeći:

- metoda bez štetnih učinaka obuhvatila je primjenu akustičkog detektorskog alata; međutim, ostvareni su vrlo slabi rezultati. Razlog tome bio je taj što je u terenskim ispitivanjima alat nije detektirao vrlo nisku razinu buke, zbog male veličine ličinki i njihove niske aktivnosti u kombinaciji s izvrsnim svojstvima zvučne izolacije pluta.

- uzorkovanje pluta je druga testirana metoda koja je dala najbolje rezultate. Ova tehnika se predlaže za praćenje prisutnosti i intenziteta napada u šumi.

Više informacija možete pronaći na www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/undercork ili kontaktiranjem na mcssilva@unac.pt

2.21. Innovative Silo for the Supply of Wood Chip (SISE) (English)

The SISE platform is an automated logistics warehouse for chip distribution, which allows quality chips to reach all points of the region, thus optimising the biomass distribution chain and reducing the CO2 footprint from transport. The SISE platform has a storage capacity of 190 m3 chips. The chips are supplied in 90-m3 trailer trucks from the main production plant in Celrà. Next, small, authorised local trucks (30-40 m3) are responsible for local distribution from the SISE platform to the end customer's silo. The SISE platform works without personnel thanks to an automated system that allows the persons responsible for transport, whether loading or unloading the chips, to work without additional help. The platform automation provides significant flexibility in wood chip delivery times to customers' silos, as it depends only on local carriers unloading over short distances. Automation and absence of staff with the SISE platform means a monitoring system had to be developed which was capable of predicting and managing demand, learning automatically as the platform delivers chips to customers, thereby optimising the transport flow to ensure the silo always has enough chips. The most conclusive end result from the SISE platform shows that this new logistics distribution model reduces CO2 emissions by over 110%. Contacts: salaforestal@salaforestal.com

Inovatīva šķeldas piegādes tvertne (SISE) (Latvian)

SISE platforma ir automatizēta loģistikas noliktava šķeldas izplatīšanai, kas ļauj kvalitatīvai šķeldai sasniegt visus reģiona punktus, tādējādi optimizējot biomasas izplatīšanas ķēdi un samazinot transporta radīto CO2 nospiedumu. SISE platformas uzglabāšanas jauda ir 190 m3 šķeldas. Šķelda tiek piegādāta 90 m3 kravas piekabēs no galvenās ražotnes Celrà. Tālāk par vietējo izplatīšanu no SISE platformas līdz gala klienta tvertnei ir atbildīgi mazi, autorizēti vietējie kravas automobiļi (30–40 m3). SISE platforma strādā bez personāla, pateicoties automatizētai sistēmai, kas par transportu atbildīgajām personām, vienalga, iekraujot vai izkraujot šķeldas, ļauj strādāt bez papildu palīdzības. Platformas automatizācija nodrošina ievērojamu elastību šķeldas piegādes termiņos klientu tvertnēs, jo tas ir atkarīgs tikai no vietējiem pārvadātājiem, kas izkrauj nelielos attālumos. Automatizācija un darbinieku neesamība ar SISE platformu nozīmē, ka bija jāizstrādā uzraudzības sistēma, kas spēj paredzēt un pārvaldīt pieprasījumu, automātiski mācoties, platformai piegādājot šķeldu klientiem, tādējādi optimizējot transporta plūsmu, lai nodrošinātu, ka tvertnei vienmēr ir pietiekami daudz šķeldas. Vispārliecinošākais SISE platformas gala rezultāts liecina, ka šis jaunais loģistikas izplatīšanas modelis samazina CO2 emisijas par vairāk nekā 110%. Contacts: salaforestal@salaforestal.com

2.22. Pilot silo with an automated biomass (forest biomass) supply system (English)

The objective is to design and plan an automated silo that supplies forest biomass and reduces transportation costs outside the current distribution area. The goals include facilitating the supply and use of renewable energy sources such as forest biomass, transferring technology between the Catalan Forestry Technology Centre and SALA FORESTAL SL, designing an automated forest biomass supply silo, reducing biomass transportation costs, and promoting the dissemination of the automated silo. The project is both technologically and financially viable, and improvements in management and logistics lead to a significant decrease in CO2 emissions. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sitja-pilot-automatitzada-subministradora-dE
Contacts: salaforestal@salaforestal.com

Izmēģinājuma tvertne ar automatizētu biomasas (meža biomasas) padeves sistēmu (Ltviana)

Mērķis ir izstrādāt un plānot automatizētu silu, kas nodrošina meža biomasi un samazina transporta izmaksas ārpus pašreizējās izplatīšanas teritorijas. Mērķi ietver atjaunojamu enerģijas avotu, piemēram, meža biomases, nodrošināšanu un izmantošanu, tehnoloģiju pārnesi starp Katalonijas mežsaimniecības tehnoloģiju centru un SALA FORESTAL SL, automatizētu meža biomases piegādes silo projektēšanu, transporta izmaksu samazināšanu, un automatizētā sila izplatīšanu. Projekts ir gan tehnoloģiski, gan finansiāli izdevīgs, un uzlabojumi vadībā un loģistikā noved pie nozīmīgas CO2 emisiju samazināšanās. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sitja-pilot-automatitzada-subministradora-dE Kontakti: salaforestal@salaforestal.com

2.23. The "sustainable bee forest" (English)

The "Sustainable Bee Forest" project introduces a novel forest management concept aimed at enhancing pollinator habitats and diversifying income streams from non-wood forest products in the state of Hesse in Germany. This initiative responds to the imperative for climate change adaptation in forestry, particularly targeting smallholder farmers grappling with forest decline. With large forested areas experiencing significant disturbances like pests, storms, and fire, there's a pressing need for afforestation measures. However, existing funding options for afforestation typically limit tree species choices. The "Sustainable Bee Forest" concept presents an innovative approach to forest management, emphasizing multifunctionality and insect-friendly practices, which have been overlooked in Central Europe. This project focuses on integrating honey and wild bee habitats into early-stage forest development, blending profitable stemwood species with pollinator-friendly plants. Unlike conventional approaches that concentrate flowering areas on forest edges, this project aims for a more holistic approach, intertwining economic profitability with conservation goals. Initial afforestation efforts on a 3.5-hectare former spruce-dominated forest involved planting robinia, chestnut, linden, bird cherry, and walnut based on research insights and expert knowledge. Effective collaboration with experienced scientists possessing the necessary methodological expertise is crucial for generating meaningful results. info@comunis-projektbuero.de

A "floresta de abelhas sustentável" (Portuguese)

A "floresta de abelhas sustentável" introduz um novo conceito de gestão florestal destinado a melhorar os habitats dos polinizadores e a diversificar os fluxos de rendimento dos produtos florestais não lenhosos en el Estado federado de Hesse (Alemania). Esta iniciativa responde ao imperativo de adaptação às alterações climáticas na silvicultura, visando particularmente os pequenos agricultores que lutam contra o declínio das florestas. Com as grandes áreas florestais a sofrerem perturbações significativas, como pragas, tempestades e incêndios, há uma necessidade premente de medidas de florestação. No entanto, as opções de financiamento existentes para a florestação limitam normalmente a escolha das espécies de árvores. O conceito do projeto apresenta uma abordagem inovadora à gestão florestal, dando ênfase à multifuncionalidade e às práticas amigas dos insectos, que têm sido negligenciadas na Europa Central. Este projeto centra-se na integração de habitats de abelhas melíferas e selvagens na fase inicial do desenvolvimento florestal, combinando espécies de troncos rentáveis com plantas amigas dos polinizadores, visando uma abordagem mais holística, entrelaçando a rentabilidade económica com objectivos de conservação. Os esforços iniciais de florestação numa floresta de 3,5 hectares, anteriormente dominada por abetos, envolveram a plantação de robínias, castanheiros, tílias, cerejeiras e nogueiras, com base em conhecimentos de investigação e de especialistas, considerado fundamental gerar resultados significativos. info@comunis-projektbuero.de

THub 3 – Sustainable forest management & ecosystem services (27 PAs)

3.1. Biomass accounting for Sustainable Forest Managment Plans using UAV data (English)

Forest biomass and carbon are pivotal for multi-objective forest management, aiding in carbon sequestration and balance assessments. Forests, as major carbon sinks, are crucial for reducing atmospheric CO2 and aiding climate change mitigation. Recent innovations demonstrate the effectiveness of 3D data from unmanned aerial vehicles (UAVs) in estimating forest biomass. In the GO-SURF project, photogrammetric data from UAVs equipped with RGB cameras at five sites (Vallombrosa, Monte Morello, Rincine, Grosseto, Maesano, and Pizzorne) have been key in deriving biomass predictors. This approach yielded high-resolution data, enabling the creation of a Canopy Height Model (CHM) normalized with regional LiDAR data. High-resolution biomass maps were then developed using forest inventory plots and detailed tree species maps. These maps were validated through ground surveys and incorporated into GO-SURF's Decision Support System Platform, providing essential tools for comprehensive forest management planning and analysis. This resulted in the first high-resolution biomass map for the study area, which can be used in conjunction with additional layers derived in GO-SURF for various analyses in order to establish multi-objective forest management plans. The derived high-resolution biomass map is available within the Decision Support System Platform developed in the context of GO-SURF. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale

Biomasas uzskaite ilgtspējīgas meža apsaimniekošanas plāniem, izmantojot UAV (bezpilota lidaparātu) datus (Latvian)

Meža biomasa un ogleklis ir ļoti svarīgi daudzmērķtiecīgai meža apsaimniekošanai, palīdzot veikt oglekļa sekvestrācijas un bilances novērtējumus. Mežiem kā galvenajiem oglekļa piesaistītājiem ir izšķiroša nozīme atmosfēras CO2 samazināšanā un klimata pārmaiņu mazināšanā. Nesenie jauninājumi liecina par bezpilota lidaparātu (UAV) 3D datu efektivitāti meža biomasas novērtēšanā. GO-SURF projektā fotogrammetriskie dati no bezpilota lidaparātiem, kas aprīkoti ar RGB kamerām piecās vietās (Vallombrosa, Monte Morello, Rincine, Grosseto, Maesano un Pizzorne), ir bijuši galvenie biomasas prognozēšanas rādītāji. Izmantojot šo pieeju, tika iegūti augstas izšķirtspējas dati, kas ļāva izveidot vainagu augstuma modeli (CHM), kas normalizēts ar reģionālajiem LiDAR datiem. Pēc tam tika izstrādātas augstas izšķirtspējas biomasas kartes, izmantojot meža inventarizācijas parauglaukumus un detalizētas koku sugu kartes. Šīs kartes tika apstiprinātas, veicot apsekojumus uz zemes, un iekļautas GO-SURF lēmumu atbalsta sistēmas platformā, nodrošinot būtiskus rīkus visaptverošai meža apsaimniekošanas plānošanai un analīzei. Rezultātā tika izveidota pirmā augstas izšķirtspējas biomasas karte izpētes teritorijai, ko var izmantot kopā ar papildu slāņiem, kas iegūti GO-SURF sistēmā, lai veiktu dažādas analīzes un izstrādātu daudzobjektīvus meža apsaimniekošanas plānus. Iegūtā augstas izšķirtspējas biomasas karte ir pieejama lēmumu atbalsta sistēmas platformā, kas izstrādāta saistībā ar GO-SURF. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale

3.2. The ARCHI method: a tool for diagnosing the vitality of trees (English)

French OG SPNA dedicated their efforts to improving the precision silviculture in Nouvelle-Aquitaine considering the diagnosis of vitality closely related to defining aging and environmental constraints for the development and physiological state of the tree. Due to the fact that chronological age is not correlated with development, classic measurements of diameter and height are not very efficient. That is the reason why ARCHI method is focused on the architecture of a tree, the way it is built and repaired, constitutes a real biological signature of its vitality. The vitality of a tree must constantly be evaluated. Therefore six physiological states are assigned to the young, adult and mature stages of development: healthy, stressed, resilient, crown retrenchment, fallback, and irreversible decline. More information about each of these stages or about the ARCHI keys available for the 18 tree species could be downloaded from: https://www.cnpf.fr/archi/, furthermore please contact christophe.drenou@cnpf.fr or visit the following website https://www.cnpf.fr/nos-actions-nos-outils/outils-et-techniques/archi

ARCHI metoda: alat za određivanje vitalnosti stabla (Croatian)

Francuska operativna skupina SPNA posvećena je poboljšanju preciznog uzgoja šuma u Nouvelle-Aquitaine regiji, temeljenog na dijagnosticiranju vitalnosti koje je usko povezano s definiranjem starenja i okolišnih ograničenja za razvoj i fiziološko stanje stabla. Zbog činjenice da kronološka dob nije u korelaciji s razvojem, klasična mjerenja promjera i visine nisu vrlo učinkovita. To je razlog zašto je ARCHI metoda fokusirana na arhitekturu stabla, način na koji je izgrađeno i popravljeno, predstavlja pravi biološki potpis njegove vitalnosti.

Vitalnost stabala mora se stalno procjenjivati, stoga je šest fizioloških stanja dodijeljeno mladom, odraslom i zrelom stadiju razvoja: zdravo, pod stresom, otporno, smanjivanje krošnje, nazadovanje, nepovratno propadanje. Više informacija o svakoj od ovih faza ili o ARCHI ključevima dostupnim za 18 vrsta stabala, možete pronaći na Internet stranici www.cnpf.fr/archi/, ili kontaktom christophe.drenou@cnpf.fr. Više informacija je dostupno na web stranici https://www.cnpf.fr/nos-actions-nos-outils/outils-et-techniques/archi

3.3. Vigil'encre : Participatory surveillance of chestnut ink (English)

INRAE scientists have developed the Vigil'encre application, available for download, to inform users about chestnut tree diseases, identify symptoms, and report affected stands. The app targets forest plot owners, chestnut orchard managers, and the general public, offering functions to inform about diseases, identify symptoms, and report affected trees. Users can compare observed symptoms to those illustrated in the app and report suspected cases, providing precise information and geolocation data. INRAE also allows users to send soil or plant samples for laboratory diagnosis, facilitating accurate disease identification and database population. Reports of ink and dieback are stored in a database for epidemiological surveillance of Phytophthora, aiding in understanding disease distribution and its interactions with drought. Utilizing materials tolerant or resistant to ink could mitigate its impact in forests or orchards. Chestnut resistance to ink varies genetically within the species, and identifying disease-resistant trees in outbreaks is crucial. The app serves as a valuable tool for disease management and research, enabling users to contribute to ongoing research efforts by reporting symptoms and locations of affected stands. By improving understanding of disease mechanisms and identifying disease-resistant trees, the app supports efforts to mitigate the impact of chestnut ink disease and ensure the sustainability of chestnut populations in Europe. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sylviculture-de-pr%C3%A9cision-en-nouvelle-aquitaine.html

Vigil'encre : Vigilância participativa da tinta do castanheiro (Portuguese)

Os cientistas do INRAE criaram o aplicativo Vigil'encre para informar sobre doenças do castanheiro, identificar sintomas e relatar povoamentos afetados. Destinado a proprietários de parcelas florestais, gestores de pomares de castanheiros e público em geral, oferece funções informativas, de identificação e comunicação de casos suspeitos. Os usuários podem comparar sintomas observados com os ilustrados na aplicação e enviar amostras para diagnóstico laboratorial. Relatórios são armazenados para vigilância epidemiológica de Phytophthora, auxiliando na compreensão da distribuição da doença e suas interações com a seca. O uso de materiais resistentes à tinta pode reduzir seu impacto. A resistência do castanheiro varia geneticamente, e identificar árvores resistentes em surtos é crucial. O Vigil'encre é uma ferramenta valiosa para gestão e pesquisa, permitindo que os usuários contribuam relatando sintomas e locais afetados. Ao aprimorar a compreensão dos mecanismos da doença e identificar árvores resistentes, apoia esforços para mitigar seu impacto e garantir a sustentabilidade dos castanheiros na Europa. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sylviculture-de-pr%C3%A9cision-en-nouvelle-aquitaine.html

3.4. Label Bas Carbone: a national forest carbon offsetting framework (English)

Operational Group from France, the SPNA devoted efforts to developing precision silviculture in Nouvelle-Aquitaine. The operational group promoted the Low carbon label (LBC) as part of the national forest carbon offsetting framework. The reason for developing the Low carbon label lies in carbon sequestration, an ecosystem service benefiting the whole society. Previously gathered data and measurements were utilised in the framework of the SPNA project to derive information on the "carbon balance" of local forests. The LBC is applied as the French standard for carbon offsetting projects but also to label the contribution of companies and communities to CO2 sequestration in the forest. Moreover, some regions use the LBC in their promotion activities directed toward preservation and the renewal of local natural resources. More information on carbon stock calculations, methods and results of the conducted studies can be found on the following website https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sylviculture-de-pr%C3%A9cision-en-nouvelle-aquitaine.html or directly contacting the Operational Group representative Mr. Olivier Gleizes olivier.gleizes@cnpf.fr

Oznaka niske razine ugljika - nacionalni okvir za kompenzaciju ugljika u šumama (Croatian)

SPNA Operativna skupina iz Francuske, posvećena je razvoju preciznog uzgoja šuma u regiji Nouvelle-Aquitaine. Operativna skupina razvila je oznaku niske razine ugljika (LBC) kao sastavnog dijela nacionalnog okvira za kompenzaciju ugljika u šumama. Polazna točka ovome radu odnosno razvoju oznake niske razine ugljika leži u sekvestraciji ugljika, odnosno usluzi ekosustava od koje koristi ostvaruje cjelokupno društvo. SPNA projekt je na temelju prethodno prikupljenih podataka i mjerenja iskazao ""ugljičnu bilancu"" lokalnih šuma. LBC se primjenjuje kao francuski standard za projekte kompenzacije ugljika, ali i za označavanje doprinosa tvrtki i zajednica zadržavanju CO2 u šumi. Štoviše, neke regije koriste LBC u svojim promidžbenim aktivnostima usmjerenim na očuvanje i obnovu lokalnih prirodnih resursa. Više informacija o izračunima zaliha ugljika, metodama i rezultatima provedenih studija možete pronaći na sljedećoj web stranici https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sylviculture-de-pr%C3%A9cision-en-nouvelle-aquitaine.html ili izravno kontaktirati predstavnika Operativne skupine g. Oliviera Gleizesa olivier.gleizes@cnpf.fr

3.5. Specific silvicultural itineraries to optimize the production of quality timber and economic yield of Pinus pinaster (English)

Four silvicultural scenarios have been created considering the wood quality:

- Standard scenario (M2): Involves three thinnings and a final felling.

- Short rotation scenario with subsidies (M4): Includes one thinning and a final felling.

- No management scenario (M8): Only comprises a final felling, assuming natural mortality from the plantation.

- Multi-product scenario (MG2): Offers two alternatives, one with plantation and the other with natural regeneration followed by thinning after 5 years.

Economic analyses indicate that the minimum site quality for profitability is in medium sites. In lower-quality areas, profitability is possible with good natural regeneration and subsidies. The MG2 scenario stands out as the most profitable in all conditions, except in quality 7m with a 2% interest rate. This scenario provides higher profitability than M2 but requires less time and fewer silvicultural actions. Natural regeneration proves more profitable compared to plantation due to cost savings.

For more information, you can consult the following link: https://www.sigcamaderadecalidad.info/

Itinerarios silviculturales específicos para optimizar la producción de madera de calidad y el rendimiento económico del Pinus pinaster (Spanish)

Se han creado cuatro escenarios silviculturales considerando la calidad de la madera:

- Escenario estándar (M2): Involucra tres claras y una corta final.

- Escenario de turno corto con subsidios (M4): Implica una clara y una corta final.

- Escenario sin gestión (M8): Solo incluye una corta final, asumiendo una mortalidad natural desde la plantación.

- Escenario multiproducto (MG2): Ofrece dos alternativas, una con plantación y otra con regeneración natural seguida de clareo después de 5 años.

Los análisis económicos indican que la calidad mínima de estación para obtener rentabilidad está en estaciones medias. En zonas de menor calidad, la rentabilidad es posible con buena regeneración natural y subsidios. El escenario MG2 se destaca como el más rentable en todas las condiciones, excepto en calidad 7m con una tasa de interés del 2%. Este escenario proporciona mayor rentabilidad que M2, pero requiere menos tiempo y menos acciones silviculturales. La regeneración natural resulta más rentable en comparación con la plantación debido al ahorro de costos.

Para más información, podéis consultar al siguiente enlace: https://www.sigcamaderadecalidad.info/

3.6. Mapping of forest roads to support touristic activities (English)

Mapping forest trails is important for various aspects of sustainable forest management. In this context, it is crucial to accelerate the mapping of existing forest roads and identify potential problems. It is also necessary to determine which means of transportation can be used on these roads. In this context, GO-SURF has mapped the existing roads in its test areas using GNSS receivers and classified them based on their functionality, and identifying any maintenance issues. The result was a mapping of the existing road network and its condition, which is a prerequisite for identifying additional roads/trials to be opened in the forest. Through the use of low-cost GNSS receivers and/or the development of mobile applications, it is indeed possible to map the forest road infrastructure quite easily. Unfortunately, due to the lack of management over the last 30 years, some old paths and trails have been lost in some areas. This discrepancy has resulted in a reduced level of existing and usable road infrastructure for tourism purposes compared to what was expected based on regional technical maps. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale, Francesca Giannetti (francesca.giannetti@unifi.it).

Kartiranje gozdnih cest za podporo turističnim dejavnostim (Slovenian)

Kartiranje gozdnih cest je pomembno za različne vidike trajnostnega gospodarjenja z gozdovi. V tem okviru je za ukrepanje ključnega pomena pospešiti kartiranje obstoječih gozdnih cest in opredeliti morebitne težave. Prav tako je bistveno določiti, katera prevozna sredstva se lahko uporabljajo na teh cestah. V tem kontekstu je GO-SURF na svojih testnih območjih s sprejemniki GNSS kartiral obstoječe ceste in jih razvrstil glede na njihovo funkcionalnost, s čimer je predhodno opredelil obstoječe in potencialno dostopne poti ter hkrati ugotovil morebitne težave z vzdrževanjem. Rezultat je bil kartiranje obstoječega cestnega omrežja in njegovega stanja, kar je predpogoj za določitev dodatnih poti, ki jih je treba odpreti v gozdu. Z uporabo nizkocenovnih sprejemnikov GNSS in/ali razvojem mobilnih aplikacij je dejansko mogoče precej preprosto kartirati gozdno cestno infrastrukturo. Zaradi pomanjkljivega upravljanja v zadnjih 30 letih so nekatere stare poti in steze na nekaterih območjih žal izgubljene. Posledica tega neskladja je manjša raven obstoječe in uporabne cestne infrastrukture za turistične namene v primerjavi s pričakovanji na podlagi regionalnih tehničnih zemljevidov. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale, Francesca Giannetti (francesca.giannetti@unifi.it).

3.7. Support multi-object forest management plans through easy-access information (English)

To support sustainable forest management aimed at maximising ecosystem services through new silvicultural practices access to a range of information that allows forest managers to quickly retrieve data is essential, with the ultimate goal of achieving certification for ecosystem services. In this context, the PRI.FOR.MAN OG, which has developed a decision support system (DSS) in the Friuli-Venezia Giulia region, provides various user-friendly graphical interfaces for accessing different types of information. The DSS provides the user with information on forest type categories, the availability of existing forest management plans, forest roads, annual growth wood, the presence of disturbances, environmental constraints, the protective role of forest vegetation, the location of biotopes, parks and regional or state reserves, Natura 2000 areas All these elements are essential for sustainable forest management and provide forest managers with important information for the development of multi-purpose forest management plans and measures. This information before the OG was scattered on various local authority websites. The PRI.FOR.MAN has made it possible to integrate this information into a single database and in a Decision Support System (DSS), which has been designed specifically for the forestry context. Homogenising the information and making it accessible in user-friendly systems is the key to ensuring data accessibility. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali, francesca.giannetti@unifi.it

Podpora večpredmetnim načrtom gospodarjenja z gozdovi z enostavno dostopnimi informacijami (Slovenian)

Za podporo trajnostnemu gospodarjenju z gozdovi, katerega cilj je z novimi gozdarskimi praksami čim bolj povečati ekosistemske storitve, je bistvenega pomena dostop do vrste informacij, ki upravljavcem gozdov omogočajo hitro pridobivanje podatkov, s končnim ciljem pridobitve certifikata za ekosistemske storitve. V tem okviru projekt PRI.FOR.MAN OG, ki je razvil sistem za podporo (DSS) odločanju v deželi Furiuli-Venezia Giulia, ki zagotavlja različne uporabniku prijazne grafične vmesnike za dostop do različnih informacij. DSS zagotavlja uporabniku informacije o kategorijah gozdnih tipov, razpoložljivosti obstoječih gozdnogospodarskih načrtov, gozdnih cestah, letni prirast lesa, prisotnost motenj, okoljske omejitve, zaščitna vloga gozdne vegetacije, lokacija biotopov, parkov in regionalnih ali državnih rezervatov, območja Natura 2000. Vsi ti elementi so temeljni za trajnostno gospodarjenje z gozdovi in zagotavljajo bistvene informacije za upravljavce gozdov pri pripravi večnamenskih gozdnogospodarskih načrtov in ukrepov. Te informacije so bile so bile pred uvedbo OG razpršene po različnih spletnih straneh lokalnih organov. Projekt PRI.FOR.MAN je omogočil združitev teh podatkov v enotno zbirko in v sistem za podporo odločanju (DSS), ki je bil zasnovan posebej za gozdarski kontekst. Usklajevanje informacij in njihova dostopnost v uporabniku prijaznih sistemih je ključnega pomena za zagotavljanje dostopnosti podatkov. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali, francesca.giannetti@unifi.it

3.8. Community forest arrangements as ideal instance for the realization of the profit- sharing model of PRIFORMAN Project (English)

Community forest arrangements are strategic tools in forestry for enhancing business networks and valuing agro-silvo-pastoral lands. They promote ecosystem services and conservation, recommended by the TUFF and other Italian legal provisions for collective forest management. These arrangements enable both companies and small forest owners to collaboratively manage forests, addressing challenges like owner absenteeism, land fragmentation, and gaps in forestry knowledge. Community forests facilitate a profit-sharing model developed by PRI.FOR.MAN, allowing profit distribution not just from timber but from multifaceted management aligning with stakeholder desires and regulatory frameworks. This model is sustainable economically—reducing costs and boosting profits; environmentally—ensuring proper forest management; and socially—supporting participatory management and helping sustain mountain populations. Challenges emerged during the project, including difficulties in engaging all forest owners and their hesitancy to delegate management long-term despite solid legal and technical frameworks. Owners preferred immediate high returns from selling timber or short-term contracts over potentially riskier long-term agreements. The PRI.FOR.MAN project drafted a profit-sharing contract yet to be adopted by owners. The ongoing NET4GO Project in Veneto aims to implement these innovations, moving towards practical applications. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali

Kopienas mežu apsaimniekošana kā ideāls piemērs PRIFORMAN projekta peļņas sadales modeļa īstenošanai (Latvian)

Kopienas mežu apsaimniekošanas pasākumi ir stratēģiski instrumenti mežsaimniecībā, lai stiprinātu uzņēmējdarbības tīklus un novērtētu agro-silvo-pastorālās zemes. Tie veicina ekosistēmu pakalpojumus un saglabāšanu, ko iesaka TUFF un citi Itālijas tiesību akti par kolektīvo mežu apsaimniekošanu. Šie pasākumi ļauj gan uzņēmumiem, gan mazajiem meža īpašniekiem kopīgi apsaimniekot mežus, risinot tādas problēmas kā īpašnieku prombūtne, zemes sadrumstalotība un mežsaimniecības zināšanu trūkums. Kopienas meži atvieglo PRI.FOR.MAN izstrādāto peļņas sadales modeli, kas ļauj sadalīt peļņu ne tikai no kokmateriāliem, bet arī no daudzpusīgas apsaimniekošanas, kas atbilst ieinteresēto personu vēlmēm un normatīvajiem aktiem. Šis modelis ir ilgtspējīgs no ekonomiskā viedokļa - samazina izmaksas un palielina peļņu; no vides viedokļa - nodrošina pareizu mežu apsaimniekošanu; un no sociālā viedokļa - atbalsta līdzdalīgu apsaimniekošanu un palīdz uzturēt kalnu apdzīvotību. Projekta laikā radās problēmas, tostarp grūtības iesaistīt visus meža īpašniekus un viņu vilcināšanās deleģēt apsaimniekošanu ilgtermiņā, neraugoties uz stabilu tiesisko un tehnisko regulējumu. Īpašnieki deva priekšroku tūlītējai augstajai peļņai no koksnes pārdošanas vai īstermiņa līgumiem, nevis potenciāli riskantākiem ilgtermiņa līgumiem. PRI.FOR.MAN projekta ietvaros tika izstrādāts peļņas sadales līgums, kas īpašniekiem vēl jāpieņem. Patlaban Veneto reģionā notiekošā NET4GO projekta mērķis ir ieviest šos jauninājumus, pārejot uz praktisku pielietojumu. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali

3.9. Sharing-profits methodology for community forest arrangement (English)

The PRI.FOR.MAN Project aimed to refine profit-sharing in community forest management, ensuring fair timber profits for each owner. Unlike traditional methods that use surface area for profit distribution—a system that disadvantages smaller owners—this project innovates with a model sensitive to owner needs in the Italian context. To engage forest owners, the project guarantees an annual timber income enticing enough to delegate management to third parties, alongside ensuring these managers receive fair financial compensation. Timber valuation is assessed via drone photogrammetry, considering factors like accessibility, wood types, and market prices. Profit distribution consists of a fixed component based on forest area, typically modest, and a variable component determined by each parcel's volume relative to the total forest volume. Challenges arose during a case study in Tarvisio, revealing owners' preferences for immediate high returns from outright sales and short-term individual contracts over the risks of long-term shared management. These insights are critical for refining the approach in ongoing project developments. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali

Peļņas sadales metodoloģija kopienas mežu sakārtošanai (Latvian)

Projekta PRI.FOR.MAN mērķis bija pilnveidot peļņas sadali kopienas mežu apsaimniekošanā, nodrošinot taisnīgu koksnes peļņu katram īpašniekam. Atšķirībā no tradicionālajām metodēm, kurās peļņas sadalei izmanto platību - sistēmu, kas ir neizdevīga mazajiem īpašniekiem, - šis projekts ievieš jauninājumus, izmantojot modeli, kas ņem vērā īpašnieku vajadzības Itālijas kontekstā. Lai iesaistītu meža īpašniekus, projekts garantē gada ienākumus no koksnes, kas ir pietiekami pievilcīgi, lai deleģētu apsaimniekošanu trešām personām, vienlaikus nodrošinot, ka šie apsaimniekotāji saņem taisnīgu finansiālo atlīdzību. Koksnes novērtēšana tiek veikta, izmantojot dronu fotogrammetriju, ņemot vērā tādus faktorus kā pieejamība, koksnes veidi un tirgus cenas. Peļņas sadale sastāv no fiksētas daļas, kuras pamatā ir meža platība, kas parasti ir neliela, un mainīgās daļas, ko nosaka katra zemes gabala apjoms attiecībā pret kopējo meža apjomu. Tarvisio gadījuma pētījuma laikā radās problēmas, kas atklāja, ka īpašnieki dod priekšroku tūlītējai augstai peļņai no tiešās pārdošanas un īstermiņa individuālajiem līgumiem, nevis ilgtermiņa kopīgas apsaimniekošanas riskiem. Šīs atziņas ir ļoti svarīgas, lai pilnveidotu pieeju pašreizējā projekta izstrādē. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali

3.10. Creation of clonal seed orchards for the conservation of Douglas-fir germplasm (English)

Duglasia seedlings are usually purchased from foreign nurseries, which does not guarantee their suitability for the Tuscan environment. It is therefore important that the FRM seedlings have a high phenotypic, genetic and adaptive quality and are suitable for the Tuscan areas. In order to qualify the regional chain of forest nurseries for the production of Douglas fir planting material, it is important to introduce innovation and quality into the Tuscan chain of nurseries for this species. With the technical support of CREA-FL (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria Foreste e Legno), the Do.Na.To OG has created two clonal seed orchards at two different altitudes for the conservation of Douglas fir germplasm derived from the material of the best phenotypes of the IUFRO field trial with provenances and progenies in Faltoni (Arezzo) and Vallombrosa (Firenze), representing a reference for the ex-situ germplasm bank at national and international level. The clones obtained from the top phenotypes were collected from the highest branches of the tree crowns and used in the seed orchards. These grafts will ensure the conservation of Douglas fir germplasm and the medium and long-term supply of genetically tested propagation material. Genetic conservation and the production of high-quality propagation material are very important for Douglas fir. It is important to reduce the possibility of pest introduction through the FMP and to ensure the conservation of locally adapted genetic material, especially in the current context of climate change. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane, Solaria Anzilotti solaria.anzilotti@unifi.it

Vzpostavitev klonskih semenskih nasadov za ohranjanje zarodne plazme duglazije (Slovenian)

Sadike duglazije se večinoma kupujejo v tujih drevesnicah, kar ne zagotavlja njihove primernosti toskanskemu okolju. Zato je pomembno da so sadike FRM visoke fenotipske, genetske in prilagoditvene kakovosti, primerne za toskanska območja. Za usposobitev regionalne verige gozdnih drevesnic za proizvodnjo sadilnega materiala duglazije je pomembno, da se v toskansko verigo drevesnic te vrste uvedeta inovativnost in kakovost. S tehnično podporo CREA-FL (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria Foreste e Legno) je v okviru projekta Do.Na. OG ustanovila dva klonska semenska nasada na dveh kontrastnih nadmorskih višinah za ohranjanje zarodne plazme duglazije, ki izhaja iz materiala, izbranega v okviru najboljših fenotipov poljskega poskusa provenienc in potomcev IUFRO v Faltoni (Arezzo) in Vallombrosa (Firenze) ter predstavlja referenco za banko zarodne plazme ex-situ na nacionalni in mednarodni ravni. Sklopi, pridobljeni iz vrhunskih fenotipov, so bili zbrani z najvišjih vej v krošnji in uporabljeni v semenskih nasadih. Ti cepiči bodo zagotovili ohranjanje zarodne plazme duglazije in srednje- in dolgoročno oskrbo z gensko testiranim razmnoževalnim materialom. Gensko ohranjanje in pridobivanje visokokakovostnega razmnoževalnega materiala sta za duglazijo zelo pomembna. Pomembno je zmanjšati možnost vnosa škodljivih organizmov s FMP in zagotoviti ohranjanje lokalno prilagojenega genskega materiala, zlasti v sedanjih razmerah podnebnih sprememb. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane, Solaria Anzilotti solaria.anzilotti@unifi.it

3.11. Good practices in Do.Na.To Project communication and technical formation (English)

The importance of communication in the management of Douglas fir forests has proved crucial for the dissemination of knowledge and innovation in Tuscany. As part of the Do.Na.To. OG, Compagnia delle Foreste, a company specialising in the forestry sector, was responsible for communication in order to reach as many stakeholders as possible through various information products and platforms. In particular, it took care of the image of the operational group and provided information on the activities carried out and the results achieved through: Website, newsletter, brochures, interviews and videos. The Accademia dei Gergofili also organised three conferences to publicise the initial, intermediate and final results of the project through the publication of minutes. In addition, a series of guided tours were organised in Germany, where demonstration plots were presented in order to gain new knowledge about the management of Douglas fir and to exchange with experts from other European countries. This was very important to illustrate the medium to long-term effects of the silvicultural protocols applied and to obtain detailed information on the potential impacts of Douglas fir management. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane, Solaria Anzilotti solaria.anzilotti@unifi.it

Dobre prakse komunikacije in tehničnega oblikovanja projekta Do.Na.To (Slovenian)

Pomen komunikacije o gospodarjenju z gozdovi duglazije izkazal se je od ključnega pomena za širjenje znanja in inovacij v Toskani. V okviru projekta Do.Na.To. OG je bila družba Compagnia delle Foreste, podjetje, specializirano za gozdarski sektor, odgovoren za komuniciranje, s ciljem, da z različnimi informacijskimi izdelki in platformami doseže čim več zainteresiranih strani. Zlasti je skrbela za podobo operativne skupine ter zagotavljala informacije o izvedenih dejavnostih in doseženih rezultatih prek: spletne strani, glasil, brošur, intervjujev in videoposnetkov. Accademia dei Gergofili je organizirala tudi tri konference za promocijo začetnih, vmesnih in končnih rezultatov projekta z objavo zbornikov. Poleg tega je v Nemčiji organizirana vrsta vodenih ogledov, na katerih so bila predstavljena demonstracijska območja z namenom pridobivanja novih znanj o upravljanju z duglazija in izmenjave mnenj s strokovnjaki iz drugih evropskih držav. To je bilo zelo pomembno za vizualizacijo srednje- do dolgoročnih učinkov uporabljenih gozdnogojitvenih protokolov in pridobitev podrobnih informacij o možnih vplivih gospodarjenja z duglazijevo jelko. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane, Solaria Anzilotti solaria.anzilotti@unifi.it

3.12. GO SURF: participatory approach to forest management (English)

Decision Support Systems for Forestry (DSSF) are recognized as vital tools for implementing sustainable forest management and providing multiple ecosystem services. Despite past disappointments due to complexity, GO-SURF adopted a participatory approach in developing DSS, ensuring dialogue among stakeholders and aligning the system with users' actual needs. The development process focused on four key components: problem analysis, knowledge management, results presentation, and development language, with each phase guided by a participatory approach. Stakeholder involvement was critical in identifying target users and their needs, shaping the knowledge system, and guiding technical implementation. The application includes a web-based Geographic Information System (Web-GIS) interface to streamline spatial analysis and report generation. In the GO-SURF project, stakeholder participation improved FDSS outcomes, although the participatory approach requires time, resources, and stakeholder agreement on objectives. Establishing an Operational Group within the PEI-AGRI initiative facilitated stakeholder involvement from the project's inception, ensuring alignment in process objectives. This participatory approach enhances the relevance and effectiveness of decision-making tools in sustainable forest management, bridging the gap between research and practical application and ensuring the adoption of user-friendly systems tailored to stakeholders' needs. Contact: francesca.giannetti@unifi.it

GO SURF: abordagem participativa da gestão florestal (Portuguese)

Os Sistemas de Apoio à Decisão para a Silvicultura (SADS) são reconhecidos como ferramentas vitais para a implementação de uma gestão florestal sustentável e para a prestação de múltiplos serviços ecossistémicos. Apesar das desilusões passadas devido à complexidade, o GO-SURF adoptou uma abordagem participativa no desenvolvimento de DSS, assegurando o diálogo entre as partes interessadas e alinhando o sistema com as necessidades reais dos utilizadores. O processo de desenvolvimento centrou-se em quatro componentes chave: análise do problema, gestão do conhecimento, apresentação dos resultados e linguagem de desenvolvimento, sendo cada fase orientada por uma abordagem participativa. O envolvimento das partes interessadas foi fundamental para identificar os utilizadores-alvo e as suas necessidades, moldar o sistema de conhecimentos e orientar a implementação técnica. A aplicação inclui uma interface de Sistema de Informação Geográfica baseada na Web (Web-GIS) para simplificar a análise espacial e a geração de relatórios. No projeto GO-SURF, a participação dos intervenientes melhorou os resultados do FDSS, embora a abordagem participativa exija tempo, recursos e o acordo dos intervenientes quanto aos objectivos. A criação de um grupo operacional no âmbito da iniciativa PEI-AGRI facilitou o envolvimento das partes interessadas desde o início do projeto, assegurando o alinhamento dos objectivos do processo. Esta abordagem participativa aumenta a relevância e a eficácia das ferramentas de tomada de decisão na gestão sustentável das florestas, colmatando a lacuna entre a investigação e a aplicação prática e assegurando a adoção de sistemas de fácil utilização adaptados às necessidades dos intervenientes. Contacto: francesca.giannetti@unifi.it

3.13. Characterisation of the genetic diversity of the chestnut heritage, soil biodiversity and biofertility Emilia-Romagna (English)

The aim of the project was to set up a collective study shared by the scientific community and chestnut growers to find out about the genetic variability of chestnut germplasm and to enhance and promote the role of the chestnut grower as a 'guardian' of biodiversity and land protection. The scientific data collected characterised the genetic diversity of Emilia-Romagna's chestnut-growing heritage and the broad biodiversity and biofertility present in the soils, highlighting the genetic variability of the region's different varieties of chestnut fruit and identifying for each variety the most suitable soil characteristics for its cultivation. Varieties recognised as being at risk of extinction were placed in special catalogue fields at two actual partner companies that became their custodians. Subsequently, the quality of the organic substance was verified by applying indices that provide indications of the capacity of the soil to conserve or dissipate the organic carbon present. Thus, after specific sampling and analysis, the microbial biomass, metabolic quotient (qCO2), microbial quotient (qMic), mineralisation quotient (qM) and soil biological fertility index (IFB) were evaluated, to highlight alarm and early warning situations with regard to organic matter content and possible loss through mineralisation. In addition, soil and its biodiversity were studied using the biological quality index (QBS-ar) at some geo-pedologically different sites, suitably selected from those from which genetic material is taken. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversamente-castagno-linee-guida-la-preservazione-e, Solaria Anzilotti (solaria.anzilotti@unifi.it).

Caracterización de la diversidad genética del patrimonio del castaño, biodiversidad de los suelos y biofertilidad Emilia-Romagna (Spanish)

El objetivo del proyecto fue realizar un estudio entre la comunidad científica y los castañicultores para conocer la variabilidad genética del germoplasma del castaño y potenciar y promover el papel del castañicultor como ""guardián"" de la biodiversidad y la protección del territorio. Los datos científicos recogidos caracterizaron la diversidad genética del patrimonio castañero de Emilia-Romana y la amplia biodiversidad y biofertilidad presentes en los suelos, poniendo de relieve la variabilidad genética de las distintas variedades de castaño de la región e identificando para cada variedad las características edáficas más adecuadas para su cultivo. Las variedades reconocidas en peligro de extinción se recogen en catálogos especiales pertenecientes a dos empresas asociadas que se convirtieron en sus custodios. Se verificó la calidad de la materia orgánica mediante la aplicación de índices que señalan la capacidad del suelo para conservar o disipar el carbono orgánico presente. Se evaluaron la biomasa microbiana, el cociente metabólico (qCO2), el cociente microbiano (qMic), el cociente de mineralización (qM) y el índice de fertilidad biológica del suelo (IFB), para poner de manifiesto situaciones de alarma y alerta temprana en relación con el contenido de materia orgánica y su posible pérdida. Se estudió el suelo y su biodiversidad mediante el índice de calidad biológica en algunos lugares de diferentes características, convenientemente seleccionados entre aquellos de los que se extrae el material genético. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversamente-castagno-linee-guida-la-preservazione-e, Solaria Anzilotti (solaria.anzilotti@unifi.it).

3.14. CASTANIBUS (English)

"CASTANIBUS brings together the CASTANI-CO and BIODIVERSAMENTE CASTAGNO projects, whose main objectives were to define and exchange" guidelines for the study, conservation and evaluation of chestnuts and the best type of management to obtain a quality product" and to regenerate the "culture of chestnut cultivation" and the role that the chestnut have as a quality product that can give revenue to be considered as "guardian of the mountain area". Castanibus was a two-day journey that brought together all the realities around the chestnut that worked for the protection and development of chestnut in the Apennine Peninsula, interesting in many aspects: carbon sequestration, biodiversity protection, and networking. The BUS allows the promotion of a proactive and constructive exchange between researchers, GO partners, farmers and regional officials, as well as the main players in chestnut production in Emilia Romagna. "The partnership between the actors of the operational groups has demonstrated the effectiveness of "networking", which is a fundamental condition for the exchange and practical integration of market needs with environmental and scientific innovation and human, historical, cultural and landscape heritage. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversamente-castagno-linee-guida-la-preservazione-e, Solaria Anzilotti (solaria.anzilotti@unifi.it), Livia Vittori Antisari (livia.vittori@unibo.it).

CASTANIBUS (Slovenian)

"CASTANIBUS združuje projekta CASTANI-CO in BIODIVERSAMENTE CASTAGNO, katerih glavni cilji so opredeliti in izmenjati ""smernice za preučevanje, ohranjanje in vrednotenje kostanja ter najboljše upravljanje kostanjevih nasadov za pridobitev kakovostnega proizvoda"", ponovno ovrednotiti ""kulturo gojenja kostanja"" in vlogo pridelovalca kostanja kot kakovostnega proizvajalca in varuha gorskega območja. Castanibus je bil dvodnevno potovanje, ki je povezalo vse realnosti, ki se vrtijo okoli kostanja ter potrebe po zaščiti in razvoju na Apeninskem polotoku, od sekvestracije ogljika do zaščite biotske raznovrstnosti, ter spodbujalo proaktivno in konstruktivno izmenjavo med raziskovalci, partnerji GO, kmeti in regionalnimi uradniki ter glavnimi akterji, ki se ukvarjajo s pridelavo kostanja v Emiliji Romanji. "Partnerstvo med akterji operativnih skupin je pokazalo učinkovitost "mreženja", ki je temeljni pogoj za izmenjavo in praktično povezovanje zahtev trga z okoljskimi in znanstvenimi inovacijami ter človeško, zgodovinsko, kulturno in krajinsko dediščino. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversamente-castagno-linee-guida-la-preservazione-e, Solaria Anzilotti (solaria.anzilotti@unifi.it) , Livia Vittori Antisari (livia.vittori@unibo.it).

3.15. Innovative Low-Impact Strategies for the GEstion of Adversity in Chestnut Fruit Forests (English)

Traditionally, fruit tree crop phytosanitary control relied on canopy spraying, leading to environmental dispersion, long application times, poor absorption, and limited efficacy against pests. This method is impractical for chestnut groves due to plant size. Endotherapy offers an efficient alternative, regardless of tree height or location, with faster application and no product dissipation. Treatment of a single tree takes about 10 minutes, enabling a chestnut farmer to treat a grove in 1-2 days. The device operates without electricity, drastically reducing water usage (a few ml per tree). Costing around 1300 €, it's paired with a commercial Thrichoderma package (~200 €), lasting 5+ years. Bite technology penetrates trees with minimal damage, promoting rapid absorption during the vegetative season. This instrument has proven effective in disease control, with minimal environmental impact and reduced application time. Collaboration among chestnut growers could mitigate the high initial cost through joint purchases. website: https://www.psingeca.it/it

Estratégias inovadoras de baixo impacto para a gestão da adversidade em florestas de castanheiros (Italian)

Tradicionalmente, o controlo fitossanitário das culturas de árvores de fruto baseava-se na pulverização da copa das árvores, o que conduzia a uma dispersão ambiental, a tempos de aplicação longos, a uma fraca absorção e a uma eficácia limitada contra as pragas. Este método é impraticável para os castanheiros devido ao tamanho das plantas. A endoterapia oferece uma alternativa eficaz, independentemente da altura ou localização da árvore, com uma aplicação mais rápida e sem dissipação do produto. O tratamento de uma única árvore demora cerca de 10 minutos, permitindo a um castanheiro tratar um castanheiro em 1-2 dias. O aparelho funciona sem eletricidade, reduzindo drasticamente o consumo de água (alguns ml por árvore). Com um custo de cerca de 1300 euros, é associado a um pacote comercial de Thrichoderma (~200 euros), com uma duração de mais de 5 anos. A tecnologia Bite penetra nas árvores com danos mínimos, promovendo uma rápida absorção durante a época vegetativa. Este instrumento provou ser eficaz no controlo de doenças, com um impacto ambiental mínimo e um tempo de aplicação reduzido. A colaboração entre os produtores de castanha poderia atenuar o elevado custo inicial através de compras conjuntas. website: https://www.psingeca.it/it

3.16. Carbon accounting for PES (English)

Italian Operational group GO.FOR.TRACK developed a decision support system to map forest resources. Besides being the source of natural raw materials, forests provide additional services, including habitats for biodiversity, purifying water, and regulating floods, carbon sequestration, provision of cooling effects, source of food, transition to a circular bioeconomy, and benefits to the overall society health. However, the economic aspect of sustainable forest management plays a crucial role in preserving rural areas through support to forest ecosystem services by developing methods for quantifying these ecosystem services. The latest information on the development of the carbon market and standardised methodologies for accurate quantification of carbon, or on the precise assessment of biomass and the identification of various types of forests, can be found on the following website https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/sviluppo-di-un-sistema-di-supporto-decisionale-la or could be obtained from Francesca Giannetti (francesca.giannetti@unifi.it).

Obračun ugljika za PES (Croatian)

Talijanska operativna grupa GO.FOR.TRACK razvila je sustav potpore odlučivanju za mapiranje šumskih resursa. Osim što su izvor prirodnih sirovina, šume pružaju dodatne usluge, uključujući staništa za bioraznolikost, pročišćavanje vode i regulaciju poplava, ponor ugljika, pružanje rashladnih učinaka, izvor hrane, potporu prijelazu na kružnu bioekonomiju te koristi za zdravlje cjelokupnog društva. No, ekonomski aspekt održivog gospodarenja šumama igra ključnu ulogu u očuvanju ruralnih područja kroz podršku uslugama šumskog ekosustava razvojem metoda za kvantificiranje tih usluga ekosustava. Najnovije informacije o razvoju tržišta ugljika i standardizaciji metodologija za točnu kvantifikaciju ugljika, odnosno za preciznu procjenu biomase i identifikaciju različitih tipova šuma, možete pronaći na sljedećoj web stranici https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/sviluppo-di-un-sistema-di-supporto-decisionale-la ili se može dobiti od Francesce Giannetti (francesca.giannetti@unifi.it).

3.17. Questionnaire on the willingness to pay for touristic-recreational activities (English)

The Italian OG BIOSEIFORTE (https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversita-e-servizi-ecosistemici-foreste-e-territorio) conducted an experimental analysis on the Monte Nerone area to assess the willingness to pay for the implementation of tourist-recreational services. The questionnaire asked for personal details, educational qualification, average income bracket, frequency of visits and an evaluation of the main ecosystem services that the area was able to provide (providing a grid of ecosystem services that characterise the area as support for the answer). The evaluation was carried out with a double key, on the one hand by assessing the importance of the various ecosystem services for the users (e.g. landscape, biodiversity, etc., with response scores from 1 to 7), and on the other hand by asking how the Nerone area responded according to their perception. These two parameters were used to determine willingness to pay. After analysing the data, a willingness to pay of 7/8 euro was estimated. Most visitors are willing to pay for an access point with information and toilets and then go on a hike. The people interviewed were very willing to respond, but data collection was not easy, as the questionnaires are often too long for people who are passing through on holiday, and it is difficult to strike a balance between the level of detail one wants to achieve and the immediacy of the answers. Contact: solaria.anzilotti@unifi.it

Questionario sulla disponibilità a pagare per le attività turistico-ricreative (Italian)

Il'Italiano GO BIOSEIFORTE (https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversita-e-servizi-ecosistemici-foreste-e-territorio) ha condotto un'analisi sperimentale sull'area del Monte Nerone per valutare la disponibilità a pagare per l'implementazione di servizi turistico-ricreativi. Il questionario chiedeva informazioni anagrafiche, titolo di studio, fascia di reddito medio, frequenza di visita e una valutazione dei principali servizi ecosistemici che l'area era in grado di fornire (fornendo una griglia di servizi ecosistemici che caratterizzano l'area come supporto alla risposta). La valutazione è stata effettuata con una doppia chiave di lettura, da un lato valutando l'importanza dei vari servizi ecosistemici per gli utenti (ad esempio il paesaggio, la biodiversità, ecc., con punteggi di risposta da 1 a 7), dall'altro chiedendo come rispondeva l'area di Nerone secondo la loro percezione. Questi due parametri sono stati utilizzati per determinare la disponibilità a pagare. Dopo l'analisi dei dati, è stata stimata una disponibilità a pagare 7/8 euro. La maggior parte dei visitatori è disposta a pagare per un punto di accesso con informazioni e servizi igienici e poi fare un'escursione. Le persone intervistate si sono dimostrate molto disponibili a rispondere, ma la raccolta dati non è stata semplice, poiché i questionari sono spesso troppo lunghi per le persone che sono di passaggio in vacanza, ed è difficile trovare un equilibrio tra il livello di dettaglio che si vuole ottenere e l'immediatezza delle risposte. Contatto: solaria.anzilotti@unifi.it

3.18. Integrated Management of the Pine Forest/Pine wood Nematode (English)

Portuguese Operational Group GI (PIN) developed the Integrated Management of the Pine Forest/Pine wood Nematode. Aiming at overcoming the constraints caused by Pine wilt disease (PWD), project activities combined new forms of forest management, fight, methods of early detection of infected trees and decrease their impact, control over the natural dispersion of the insect vector, reduction of costs for disease control actions and contribution. All mentioned was used for restoring the confidence of landowners in the maintenance, plantation and management of new areas of maritime pine. The project also analysed different factors, such are the types of trees that can be infected, the influence of forest fires on the natural dispersion of PWN, the emergence and flight of the vector under different climatic conditions, the risk of forest operations during their flight period and creation of zones of active containment to avoid the dispersion of PWN to the non-infected pine forests. The applied approach resulted in some respective conclusions which are publicly available at https://inovacao.rederural.gov.pt/images/imagens/Docs_GO/29-_OG_GI_PIN.pdf or https://federacaoflorestal.pt/. Additionally, you can contact OG on fnapf.geral@gmail.com

Integrirano upravljanje borovom šumom/borovim nematodom (Croatian)

Portugalska operativna skupina GI (PIN) razvila je Integrirano upravljanje borovom šumom/borovim nematodom. S ciljem prevladavanja prepreka uzrokovanih borovim venućem (PWD), projektne aktivnosti kombinirale su nove oblike gospodarenja šumama, borbe, metode ranog otkrivanja zaraženih stabala i smanjenje njihovog utjecaja, kontrolu prirodnog širenja vektora insekata, smanjenje troškova za akcije i doprinos kontroli bolesti. Sve navedeno iskorišteno je za vraćanje povjerenja vlasnika zemljišta u održavanje, sadnju i gospodarenje novim površinama primorskog bora. Projekt je također analizirao različite čimbenike, kao što su vrste drveća koje se mogu zaraziti, utjecaj šumskih požara na prirodnu disperziju nematoda borovog drva, pojavu i let vektora pod različitim klimatskim uvjetima, rizik šumskih operacija tijekom njihovog leta i stvaranje zona aktivnog zadržavanja kako bi se izbjeglo širenje nematoda borovog drva u nezaražene borove šume. Primijenjeni pristup rezultirao je nekim odgovarajućim zaključcima koji su javno dostupni na https://inovacao.rederural.gov.pt/images/imagens/Docs_GO/29-_OG_GI_PIN.pdf ili https://federacaoflorestal.pt/. Osim toga, možete kontaktirati OG na fnapf.geral@gmail.com

3.19. Assessment of the drudgery of work during the planting phase (English)

In the context of climate change, planting appears to be a major tool for guaranteeing the adaptation and sustainability of forests. Planting operations are recognised as arduous and give rise to work-related illnesses and accidents. The OG PIF (https://www.reseaurural.fr/centre-de-ressources/projets/plantations-innovantes-en-foret-innover-pour-installer-des-plantations) aimed to identify the phases of work carried out and to assess the arduousness of each of them, in order to target possible recommendations. The phases of making the hole and planting the seedling appear to be the most arduous and repetitive. Posture, but also repetitiveness are major factors in the arduousness. Preparing the planting site, when there are many stumps or coarse elements, directly facilitates the planter's work. Anticipation in the organisation of the work site can prevent difficulties in moving around and carrying heavy loads can decrease the workload. Another lever could be to optimise the planting tool, in particular the pickaxe. Following this study, technical sheets were drawn up to reduce the difficulty of the various stages encountered during a planting project. Contact: catherine.collet@inrae.fr

Evaluation de la pénibilité des travaux en phase de plantation (French)

Dans le contexte du changement climatique, la plantation apparaît comme un outil majeur pour garantir l'adaptation et la durabilité des forêts. Les opérations de plantation sont reconnues comme pénibles et donnent lieu à des maladies et accidents du travail. Le GO PIF (https://www.reseaurural.fr/centre-de-ressources/projets/plantations-innovantes-en-foret-innover-pour-installer-des-plantations) visait à identifier les phases de travaux réalisées et évaluer leur pénibilité, afin de cibler d'éventuelles recommandations. Les phases de réalisation du trou et de la mise en terre du plant apparaissent comme les plus ardues et répétitives. La posture, mais aussi la répétitivité sont des facteurs majeurs de pénibilité. La préparation du terrain de plantation, lorsqu'il y a de nombreuses souches ou éléments grossiers, facilite directement le travail du planteur. Anticiper l'organisation du chantier peut éviter de porter de lourdes charges et des difficultés de déplacements inutiles. Un autre levier serait d'optimiser l'outil de plantation, notamment la pioche. Suite à cette étude, des fiches techniques ont été élaborées afin de réduire la difficulté des différentes étapes rencontrées lors d'un projet de plantation. Contact : catherine.collet@inrae.fr

3.20. Technology at the service of forest renewal - mapping with drone and GPS to stake out the stand (English)

As part of the OG PIF project, the ONF and the FCBA have developed a new mapping and staking method, based on the use of a drone and a centimetre-accurate GPS. The first stage of this method involves flying over the area to be planted using a drone capable of providing photos with optimum resolution (1 to 2 cm/pixel) and geo-referenced using RTK (Real Time Kinematic) to around 1 cm. It takes ten minutes of flying time to cover 15 hectares. If the drone is not RTK-compatible, it is possible to add positions taken from a mobile GPS, as long as these points have been marked out on the ground beforehand. The photos taken during the flight are then assembled using software and the GPS coordinates recorded, to produce an orthophotograph. The orthophotograph produced will be used to define the future planting scheme. It will make it possible to identify the contours of the plot and the traffic routes, as well as to calculate the area to be planted and to position the future planting lines. Following computer processing, a map will be generated incorporating the planting scheme. The data will then be transmitted automatically to a GPS via a server, and can be used directly by operators in the field to position the planting lines. The use of the drone combined with the use of a centimeter-precision GPS by the worker has made it possible to optimize the installation of the planting lines, with productivity three times higher than with the traditional method, and to improve its ergonomics. https://www.reseaurural.fr/centre-de-ressources/projets/plantations-innovantes-en-foret-innover-pour-installer-des-plantations. Contact: Mrs Collet Catherine (catherine.collet@inrae.fr).

Tecnología al servicio de la renovación forestal: cartografía con dron y GPS para replantear un rodal (Spanish)

En el marco del proyecto PIF, la ONF y la FCBA han desarrollado un nuevo método de cartografía y replanteo, basado en la utilización de un dron y un GPS de precisión centimétrica. La primera etapa de este método consiste en sobrevolar la zona que se va a plantar con un dron con una resolución óptima (1 a 2 cm/píxel) y georreferenciadas mediante RTK (cinemática en tiempo real) a aproximadamente 1 cm. Se necesitan diez minutos de vuelo para cubrir 15 hectáreas. Si el dron no es compatible con RTK, es posible añadir posiciones tomadas con un GPS móvil, siempre que estos puntos se hayan marcado previamente en el suelo. Las fotos tomadas durante el vuelo se ensamblan mediante un programa informático y se registran las coordenadas GPS para producir una ortofotografía. Esta servirá para definir el futuro plan de plantación. Permitirá identificar las curvas de nivel de la parcela y las vías de circulación, así como calcular la superficie que se va a plantar y situar las futuras líneas de plantación. Tras el tratamiento informático, se generará un mapa que incorporará el esquema de plantación. A continuación, los datos se transmitirán automáticamente a un GPS a través de un servidor, y podrán ser utilizados directamente por los operarios sobre el terreno para posicionar las líneas de plantación. El uso del dron combinado con la utilización de un por parte del trabajador ha permitido optimizar la instalación de las líneas de plantación, con una productividad tres veces superior a la del método tradicional, y mejorar su ergonomía. https://www.reseaurural.fr/centre-de-ressources/projets/plantations-innovantes-en-foret-innover-pour-installer-des-plantations. Contact: Mrs Collet Catherine (catherine.collet@inrae.fr)

3.21. Decision support to sustainable forest planning (English)

In the Italian and European context, there is an increasing demand for forest and agroforestry companies to focus on multifunctionality. Furthermore, in recent years, the possibility of certifying some ecosystem services and multifunctional services has emerged. The first step toward certification is to have a sustainable forest management plan that details these aspects. In the case of the GO-SURF project, to obtain spatial data covering the entire forested areas within the project intervention zones, a fixed-wing UAV was used to derive some of the multifunctionality indicators. High-resolution orthophotos, for instance, were utilized to map forest types linked to biodiversity and conservation. Infrared orthophotos were employed to identify the presence of standing deadwood, which serves as a proxy for biodiversity analysis related, for example, to saproxylic insects. Additionally, roads and trails were mapped to identify potential tourist routes. The UAV has enabled the accurate mapping of some of these indicators, which are subsequently integrated into the decision support system. These data can be used to develop multifunctional and multi-objective management plans. The cost of the UAV used for mapping is indeed quite high, but companies have the option to collaborate with service providers rather than purchasing one themselves. The generated data, however, are crucial for developing multi-objective management plans. Compared to traditional survey methods, these data save time in terms of fieldwork. The use of this data also provides standardized information across the entire area, which is valuable for working towards certification of ecosystem services. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale

APOIO À DECISÃO PARA O PLANEAMENTO FLORESTAL SUSTENTÁVEL (Portuguese)

No caso do projeto GO-SURF, para obter dados espaciais que abrangessem a totalidade das áreas florestais das zonas de intervenção do projeto, foi utilizado um UAV de asa fixa para obter alguns dos indicadores de multifuncionalidade. Ortofotos de alta resolução, por exemplo, foram utilizadas para mapear os tipos de floresta ligados à biodiversidade e à conservação. Ortofotos de infravermelho foram utilizadas para identificar a presença de madeira morta em pé, que serve como proxy para análise de biodiversidade relacionada, por exemplo, a insetos saproxílicos. Além disso, foram mapeadas estradas e trilhas para identificar potenciais rotas turísticas. O UAV permitiu o mapeamento exato de alguns destes indicadores, que são posteriormente integrados no sistema de apoio à decisão. Estes dados podem ser utilizados para desenvolver planos de gestão multifuncionais e multiobjectivos. O custo do UAV utilizado para o mapeamento é, de facto, bastante elevado, mas as empresas têm a opção de colaborar com prestadores de serviços em vez de o adquirirem elas próprias. Os dados gerados são, no entanto, cruciais para o desenvolvimento de planos de gestão multi-objectivos. Em comparação com os métodos tradicionais de levantamento, estes dados poupam tempo em termos de trabalho de campo. A utilização destes dados também fornece informação padronizada em toda a área, o que é valioso para trabalhar no sentido da certificação dos serviços ecosistémicos. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale

3.22. Decisional Support System of forest management plans (English)

The Common International Classification System of Ecosystem Services (CICES) classifies ecosystem services into provisioning, regulation and maintenance, and cultural groups, assessable both physically and economically. In GO-FORTRACK, spatial methods were used to quantify physical aspects like carbon, biomass, and forest types, aiding in prediction, regulation, and maintenance. These maps were integrated into a decision support system, facilitating access for forest managers at the parcel scale, and aligning with Italian forestry laws mandating individual parcel descriptions for management plans. This approach streamlines report generation, saving time and reducing costs associated with plan development. This straightforward report automation tool allows forest managers to save time on report and plan writing, which can then be allocated to other forest management-related activities. It can significantly reduce the costs associated with the drafting and development of a forest management plan. Additionally, the availability of various maps within the system aids in the analysis of plan objectives and interventions, providing a more detailed knowledge framework. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/sviluppo-di-un-sistema-di-supporto-decisionale-la

Sistema de apoio à decisão dos planos de gestão florestal (Portuguese)

O Sistema de Classificação Internacional Comum de Serviços Ecossistémicos (CICES) classifica os serviços ecossistémicos em grupos de aprovisionamento, regulação e manutenção, e culturais, avaliáveis tanto física como economicamente. No GO-FORTRACK, foram utilizados métodos espaciais para quantificar aspectos físicos como o carbono, a biomassa e os tipos de floresta, ajudando na previsão, regulação e manutenção. Estes mapas foram integrados num sistema de apoio à decisão, facilitando o acesso dos gestores florestais à escala da parcela, em conformidade com as leis florestais italianas que exigem descrições individuais das parcelas para os planos de gestão. Esta abordagem simplifica a geração de relatórios, poupando tempo e reduzindo os custos associados ao desenvolvimento de planos. Esta ferramenta simples de automatização de relatórios permite que os gestores florestais poupem tempo na elaboração de relatórios e planos, que podem depois ser atribuídos a outras actividades relacionadas com a gestão florestal. Pode reduzir significativamente os custos associados à elaboração e desenvolvimento de um plano de gestão florestal. Além disso, a disponibilidade de vários mapas no sistema ajuda na análise dos objectivos e intervenções do plano, fornecendo um quadro de conhecimento mais detalhado. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/sviluppo-di-un-sistema-di-supporto-decisionale-la

3.23. A User-Friendly Platform for Bridging the Gap between Carbon Credit Demand and Supply (English)

Operational Group CO2 STORED in FOREST MANAGEMENT (MARCHE) created a platform for the voluntary sustainability credit exchange. The platform aimed at linking the demand and the supply of carbon credits deriving from Sustainable Forest Management (SFM) in a voluntary trading market for tonnes of stored carbon. The platform promotes the benefits of the forest certification according to SFM: the ability to store more carbon than unmanaged (i.e. uncut) and untended forests; contribution to climate change mitigation; prevention of natural and environmental hazards such as forest fires, hydrogeological disruption, soil erosion; the biodiversity and the landscape protection; tourist-recreational attractions and forest products and by-products, along with culture, traditions and work for skilled forest workers. Considering the ecosystem services, the active management actions lead to the absorption of several thousand tonnes of CO2, contributing in parallel to the creation of new business opportunities for forest managers. More information on this Italian OG could be obtained by contacting Mr. Marco Perrino (perrino@dream-italia.net) or Ms. Solaria Anzilotti (solaria.anzilotti@unifi.it). Information is available on OG website also https://www.co2marche.it/

Platforma prilagođena korisniku za smanjenje jaza između potražnje i ponude ugljičnih kredita (Croatian)

Operativna skupina MARCHE - CO2 uskladišten kroz upravljanje šumama, stvorila je platformu za dobrovoljnu razmjenu kredita za održivost. Platforma povezuje potražnju i ponudu ugljičnih kredita koji proizlaze iz održivog gospodarenja šumama (SFM) na dobrovoljnom tržištu za trgovanje tonama pohranjenog ugljika. Platforma promovira koristi certifikacije šuma sukladno održivom gospodarenju šumama jer takve šume pohrane više ugljika nego šume kojima se ne upravlja (tj. neposječene) i nenjegovane šume; doprinose ublažavanju klimatskih promjena; sprječavaju prirodne i ekološke opasnosti kao što su šumski požari, hidrogeološki poremećaji, erozija tla; štite biološku raznolikost i krajolik; nude turističko-rekreacijske sadržaje i šumske proizvode i nusproizvode, uz kulturu, tradiciju i rad za kvalificirane šumske radnike. Obzirom na usluge ekosustava, aktivno upravljanje šumama dovodi do apsorpcije nekoliko tisuća tona ugljika, pridonoseći stvaranju novih poslovnih prilika za upravitelje šuma. Za više informacija o ovoj talijanskoj operativnoj skupini možete kontaktirati g. Marca Perrina (perrino@dream-italia.net) ili gđu. Solariu Anzilotti (solaria.anzilotti@unifi.it). Informacije su dostupne i na web stranici operativne skupine https://www.co2marche.it/

3.24. Group Certification for Sustainable Forest Management (English)

The CO2 Marche project facilitated Group Certification among forest owners, uniting public and private efforts to simplify Sustainable Forest Management Certification processes and reduce costs. This approach allows multiple forest owners to be certified as a group, with a Lead Partner overseeing compliance with certification requirements. The 'Bosco di Marca' forest consortium, spanning 9208.25 ha, successfully obtained PEFC Group Certification within the project. Forest Group Certification offers various benefits, including increased carbon storage, prevention of forest fires and hydrogeological instability, soil erosion mitigation, biodiversity protection, and improved water and air quality. It also contributes to climate change mitigation, landscape enhancement, and enhanced tourism services. The project also focused on promoting sustainable credit exchange and creating employment opportunities, particularly in areas affected by the 2019 earthquake. The certification underscores the economic value of forests, demonstrating how they can serve as both environmental and economic assets. Forest owners can quantify carbon storage and sell credits to organizations seeking to offset their emissions, thereby sustaining forest communities and preventing abandonment of inland areas. This group certification model resulted in the largest certified area in central Italy, showcasing the potential of collaboration between public and private entities to achieve common objectives. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/calcolo-e-certificazione-del-sequestro-del-carbonio

Certificação de grupo para a gestão sustentável das florestas (Portuguese)

O projeto CO2 Marche facilitou a Certificação de Grupo entre proprietários florestais, unindo esforços públicos e privados para simplificar os processos de Certificação da Gestão Florestal Sustentável e reduzir os custos. O consórcio florestal ""Bosco di Marca"", com uma área de 9208,25 ha, obteve com sucesso a Certificação de Grupo PEFC no âmbito do projeto. A Certificação de Grupo Florestal oferece vários benefícios, incluindo o aumento do armazenamento de carbono, a prevenção de incêndios florestais e instabilidade hidrogeológica, a mitigação da erosão do solo, a proteção da biodiversidade e a melhoria da qualidade da água e do ar. Contribui igualmente para a atenuação das alterações climáticas, a melhoria da paisagem e o reforço dos serviços turísticos. A certificação sublinha o valor económico das florestas, demonstrando como estas podem servir como activos ambientais e económicos. Os proprietários florestais podem quantificar o armazenamento de carbono e vender créditos a organizações que procuram compensar as suas emissões, sustentando assim as comunidades florestais e evitando o abandono das zonas interiores. Este modelo de certificação em grupo resultou na maior área certificada na Itália central, demonstrando o potencial da colaboração entre entidades públicas e privadas para atingir objectivos comuns. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/calcolo-e-certificazione-del-sequestro-del-carbonio

3.25. Enhancing Additionality Assessment of Carbon Credit of Various Interventions by Utilizing Site-Specific Historical Data in Compliance with IPCC International Standards (English)

In carbon credit additionality projects, it is essential to use precise quantification methods to avoid incorrect estimations. The CO2MARCHE Operational Group developed an international methodology based on the IPCC standards as a reference for the quantification of carbon credits. Level of the carbon credits accuracy was improved through linking the international ICPP methodology with a site-specific methodology developed within the OG. CO2MARCHE also contributed to development of the national certification standard of PEFC for carbon credits applicable for the sustainably managed forests. The project activities and achieved results proved that active forest management generates additionality and, consequently, carbon credits. All efforts conducted by the CO2MARCHE, contributed to the establishment of the National Carbon Credit Registry in Italy. More information on these amazing achievements could be found on PGs web site https://www.co2marche.it/ or by contacting the CO2MARCHE team Marco Perrino (perrino@dream-italia.net), Antonio Brunori (info@pefc.it) and Francesca Giannetti (francesca.giannetti@unifi.it).

Poboljšanje dodatnosti ugljičnog kredita različitih intervencija uporabom povijesnih podataka sukladno međunarodnim standardima IPCC-a (Croatian)

U određivanju dodanosti ugljičnog kredita ključno je koristiti precizne metode kvantifikacije kako bi se izbjegle pogreške u procjeni. Operativna skupina CO2MARCHE razvila je međunarodnu metodologiju temeljenu na standardima Međuvladinog tijela za klimatske promjene (IPCC) kao referencu za kvantifikaciju ugljičnih kredita. Razina točnosti procjene ugljičnih kredita poboljšana je povezivanjem međunarodne ICPP metodologije s metodologijom specifičnom za određenu lokaciju razvijenom unutar operativne skupine. CO2MARCHE operativna skupina je svojim radom doprinijela razvoju nacionalnog certifikacijskog standarda PEFC-a za ugljične kredite primjenjive na šumama kojima se održivo gospodari. Projektne aktivnosti i postignuti rezultati dokazali su da aktivno gospodarenje šumama stvara uvjete za kriterij dodanosti, a time i ugljične kredite. Aktivnosti provedene od strane operativne skupine CO2MARCHE pridonijeli su uspostavi Nacionalnog registra ugljičnih kredita u Italiji. Više informacija o ovim nevjerojatnim postignućima možete pronaći na web stranici PG-a https://www.co2marche.it/ ili kontaktiranjem tima CO2MARCHE Marco Perrino (perrino@dream-italia.net), Antonio Brunori (info@pefc.it) i Francesca Giannetti (francesca.giannetti@unifi.it).

3.26. Calculating Soil Carbon Credits (English)

Soil Carbon Credits are additional carbon credits that enhance ecosystem services, such as C stocking and improving rural economy, and SFM applicability. Soil Carbon Credits are additional carbon credits that enhance ecosystem services, such as C stocking and improving rural economy, and SFM applicability. AGB C was estimated in sample plots on an INFC model, BGB C was calculated using specific root-to-shoot ratios (RSR), dead wood by field analysis (measurements of the diameter of dead wood >2.5 cm and the classification based on decomposition classes on a transect) followed by the application of a function to calculate the C stored; litter C stock through the ratio of organic C mass to surface area and SOC by a collection of composite samples taken at 3 different depths (0-5 cm, 5-15 cm, 15-30 cm)and rock% and Bulk Density (BD) calculation, followed by SOC estimation through elemental analyzer. Thanks to this analysis it was possible to calculate the total C content of the forest ecosystems and compare the C storage capacity of conventionally managed forest plots (unmanaged or coppiced) and plots under SFM (transitional forest). SFM supports C storage in the various forest compartments, (soil, biomass and necromass) increases the provision of ecosystem services, and forest productivity, and contributes to climate change mitigation while providing support to the local rural economy. Contact: gregorio.fantoni@unifi.it

Cálculo dos créditos de carbono do solo (Portuguese)

Os créditos de carbono do solo são créditos de carbono adicionais que melhoram os serviços ecossistémicos, como o armazenamento de carbono e a melhoria da economia rural, e a aplicabilidade da gestão sustentável do solo. Os Créditos de Carbono do Solo são créditos de carbono adicionais que melhoram os serviços do ecossistema, tais como o armazenamento de C e a melhoria da economia rural, e a aplicabilidade do SFM. O C AGB foi estimado em parcelas de amostragem num modelo INFC, o C BGB foi calculado utilizando rácios específicos de raiz para rebento (RSR), madeira morta por análise de campo (medições do diâmetro da madeira morta >2. 5 cm e a classificação com base nas classes de decomposição num transecto), seguida da aplicação de uma função para calcular o C armazenado; o stock de C da folhada através da relação entre a massa de C orgânico e a área de superfície e o SOC através da recolha de amostras compostas colhidas a 3 profundidades diferentes (0-5 cm, 5-15 cm, 15-30 cm) e o cálculo da percentagem de rocha e da densidade aparente (BD), seguido da estimativa do SOC através de um analisador elementar. Graças a esta análise, foi possível calcular o conteúdo total de C dos ecossistemas florestais e comparar a capacidade de armazenamento de C de parcelas florestais geridas convencionalmente (não geridas ou com talhadia) e de parcelas sob GSF (floresta de transição). A GSF apoia o armazenamento de C nos vários compartimentos florestais (solo, biomassa e necromassa), aumenta a prestação de serviços ecossistémicos, a produtividade florestal e contribui para a atenuação das alterações climáticas, apoiando simultaneamente a economia rural local. Contacto: gregorio.fantoni@unifi.it

3.27. Evaluating the effectiveness of various pine pitch canker prevention methods and developing a best practices manual for plant nurseries (English)

Pine pitch canker, caused by the fungus *Fusarium circinatum*, poses significant risks in plant nursery operations by impacting seed availability and plant health. To combat this, the project developed standard procedures for disinfecting seeds, plant containers, and irrigation water, with findings detailed in a manual that outlines the most effective techniques. Testing across various pine species (*Pinus pinaster, Pinus pinea, Pinus radiata, Pinus sylvestris*), the project evaluated treatment success based on fungal presence post-treatment, germination rates, and plant size. Effective lab-tested methods were then applied in nurseries to assess real-world applicability.

Seed disinfection is critical to prevent fungal spread in nurseries. Successful seed treatments included:

- Heating water to 60°C and immersing seeds for 15 minutes.

- Soaking seeds for 30 minutes in 20% hydrogen peroxide.

- Immersing seeds for 5 minutes in 60% ethanol (70% for *P. pinea*).

- Soaking seeds for 5 minutes in a 1.9g per liter Captan solution.

For plant containers, a 30-minute soak in 20% hydrogen peroxide proved most effective without harming plant growth. Water disinfection involved treating storage reservoirs with either 1% Desogerme or 4% Hydrocare solutions. Additionally, alternatives to pine bark—which may harbor the fungus—were tested for soil porosity. Suitable substitutes include perlite (up to 30%), polystyrene foam grains (8-12mm), ADT cork grains (1-2mm), and ""falca"" shredded cork (up to 15%). These materials offer comparable benefits without the disease risk. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/desenvolvimento-de-estrat%C3%A9gias-integradas-para.html

Dažādu priežu kailcirtes profilakses metožu efektivitātes novērtēšana un paraugprakses rokasgrāmatas izstrāde stādu audzētavām (Latvian)

Priedes piķa vēzis, ko izraisa sēne *Fusarium circinatum*, rada ievērojamu risku stādaudzētavās, ietekmējot augu veselību. Lai to novērstu, projekta ietvaros tika izstrādātas standarta procedūras sēklu, augu konteineru un apūdeņošanas ūdens dezinfekcijai, un iegūtie rezultāti sīki izklāstīti rokasgrāmatā, kurā aprakstītas efektīvākās metodes. Testējot dažādas priežu sugas (*Pinus pinaster, Pinus pinea, Pinus radiata, Pinus sylvestris*), projektā novērtēja apstrādes panākumus, pamatojoties uz sēņu klātbūtni pēc apstrādes, dīgtspēju un augu lielumu.

Sēklu dezinfekcija ir ļoti svarīga, lai novērstu sēnīšu izplatīšanos kokaudzētavās. Veiksmīgi tika veikta šāda sēklu apstrāde:

- ūdens uzsildīšana līdz 60 °C un sēklu iegremdēšana uz 15 minūtēm.

- Sēklu mērcēšana 20 % ūdeņraža peroksīdā 30 minūtes.

- Sēklu iegremdēšana uz 5 minūtēm 60 % etanolā (70 % *P. pinea*).

- Sēklu mērcēšana uz 5 minūtēm 1,9 g kaptāna šķīdumā uz litru.

Augu konteineros 30 minūšu mērcēšana 20 % ūdeņraža peroksīdā izrādījās visefektīvākā, nekaitējot augu augšanai. Ūdens dezinfekcija ietvēra uzglabāšanas rezervuāru apstrādi ar 1 % Desogerme vai 4 % Hydrocare šķīdumiem. Turklāt tika pārbaudītas augsnes porainības alternatīvas priedes mizai, kas var būt sēnītes pārnēsātāja, lai nodrošinātu augsnes porainību. Piemēroti aizstājēji ir perlīts (līdz 30 %), putupolistirola graudi (8-12 mm), ADT korķa graudi (1-2 mm) un ""falca"" sasmalcināts korķis (līdz 15 %). Šie materiāli sniedz salīdzināmas priekšrocības bez slimību riska.

https://ec.europa.eu/eip/agriculture/en/find-connect/projects/desenvolvimento-de-estrat%C3%A9gias-integradas-para.html

ITHub 4 – Non-wood forest products (22 PAs)

4.1. Mechanised resin extraction method (English)

The mechanized resin extraction method is an innovation based on collecting resin with a closed resin collecting system. After incisions of 6 cm in diameter are drilled in a tree, a connector with a hermetic bag is introduced, which will allow the resin to be collected with high purity. To improve resin production, a stimulant is applied to the collection surface. The drilling operation will be repeated over the tapping season about 6 times every 21 days on average depending on site conditions. The main advantages of this method are (i) resin with a higher turpentine content and a lower percentage of contaminations, (ii) elimination of pre-extraction debarking tasks, (iii) simplification of worker training which facilitates the incorporation of new resin extraction workers, (iv) reduction of physical effort which facilitates the incorporation of women, and (v) greater compatibility with timber harvesting and thinning activities. The main disadvantages of the mechanized method are (i) higher investment in materials (bags, stimulants, drill), (ii) management of waste (bags and connectors), (iii) lack of industrial development for the processing of resin contained in bags, and (iv) lower resin production yield (grams/tree). The mechanized resin extraction system originates in the USA and it is adapted to conditions in Spain by GO RESINLAB: aida.rodriguez@cesefor.com, https://vimeo.com/754512934/3447f5cb73

Mekaaninen pihkankeruumenetelmä (Finnish)

Mekaaninen pihkankeruumenetelmä on innovaatio, joka perustuu pihkan keräämiseen suljetulla pihkankeruujärjestelmälllä. Ensin puuhun porataan halkaisijaltaan 6 cm viillot, jonka jälkeen puuhun liitetään ilmatiivis pussi, jonka avulla pihka voidaan kerätä puhtaasti. Pihkan erityksen parantamiseksi keräyspinnalle levitetään stimulanttia. Poraus toistetaan pihkankeruukaudella noin 6 kertaa keskimäärin 21 päivän välein riippuen paikkaolosuhteista. Tämän menetelmän tärkeimmät edut ovat (i) pihka, jolla on korkeampi tärpättipitoisuus ja pienempi kontaminaatioprosentti, (ii) pihkankeruuta edeltävää puunkuorimista ei tarvitse tehdä, (iii) työntekijöiden koulutuksen yksinkertaistaminen, joka edistää uusien pihkankeruutyöntekijöiden mukaan ottamista, (iv) fyysisen rasituksen vähentäminen, joka edistää naisten osallistumista ja (v) parempi yhteensopivuus puunkorjuun ja harvennustoimien kanssa. Mekanisoidun menetelmän tärkeimmät haitat ovat (i) suuremmat investoinnit materiaaleihin (pussit, stimulantit, pora), (ii) jätehuolto (pussit ja liittimet), (iii) teollisen kehityksen puute pussitetun pihkan jatkojalostamiseksi ja (iv) pienempi pihkantuotanto (g/puu). Mekaaninen pihkankeruujärjestelmä on peräisin Yhdysvalloista ja maaseudun innovaatioryhmä GO RESINLAB on mukauttanut sen Espanjan olosuhteisiin: aida.rodriguez@cesefor.com, https://vimeo.com/754512934/3447f5cb73

4.2. Brochure for the collection of soil samples in cork oak forests (English)

The OG NUTRISUBER: The analysis of soil samples collected in cork oak forests allows the understanding of the physical and chemical characteristics of the soil, along with foliar analysis, providing support for the recommendation of the most appropriate fertilization. Soil sample collection should be carried out in advance of fertilizer application, preferably during a period when the soil is sufficiently moist for this operation. If the terrain is not uniform, it should be divided into relatively homogeneous plots in terms of color, slope, drainage, and forest management type. To raise awareness among forest producers, a leaflet has been prepared, available in both paper and online formats, in an accessible and easy-to-understand language. The leaflet outlines when and how the analysis should be conducted, depending on the type of existing forest plantation: before planting, in a young plantation, in a mature plantation, or even in irrigated cork oak plantations. It also specifies the necessary equipment for proper sample collection and how to package and send them to the laboratory for obtaining results. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/nutri%C3%A7%C3%A3o-e-fertiliza%C3%A7%C3%A3o-do-montado-de-sobro.html, contact: cristina.sempiterno@iniav.pt

Folheto da colheita de amostras de solo em montados de Sobro (Portuguese)

O GO NUTRISUBER: A análise das amostras de solo recolhidas em montados de sobro permite conhecer as características físicas e químicas do solo, constituindo, juntamente com a análise foliar, suporte para a recomendação da fertilização mais adequada. A recolha de amostras de solo deve ser realizada com antecedência em relação à aplicação de fertilizantes, sendo aconselhável o período em que o solo apresenta uma humidade que permita esta operação. Se o terreno não for uniforme, deve ser dividido em parcelas relativamente homogéneas em relação à cor, inclinação, drenagem e tipo de gestão florestal. Assim, para sensibilizar os produtores florestais, foi preparado um folheto, que está disponível em papel e online, numa linguagem acessível e fácil de entender. O folheto define quando e como é que deve ser feita a análise, dependendo do tipo de povoamento florestal existente: antes do povoamento, num povoamento jovem, num povoamento adulto ou até mesmo em plantações de sobreiro regadas. Também define que equipamento é necessário para a correta recolha de amostras e como embalar e enviar para o laboratório para obter os resultados. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/nutri%C3%A7%C3%A3o-e-fertiliza%C3%A7%C3%A3o-do-montado-de-sobro.html, contactar: cristina.sempiterno@iniav.pt

4.3. Brochure for the collection of soil samples in stone pine (English)

The OG FERTIPINEA: The analysis of soil samples collected in stands of stone pine allows understanding of the physical and chemical characteristics of the soil, together with foliar analysis, providing support for the recommendation of the most appropriate fertilization. Soil sampling should be done well in advance of fertilizer application, preferably during a period when the soil moisture content allows for this operation. If the terrain is not uniform, it should be divided into relatively homogeneous plots in terms of color, slope, drainage, and type of forest management. Therefore, to raise awareness among forest producers, a brochure has been prepared, available in both paper and online formats, in accessible and easy-to-understand language. The brochure outlines when and how soil analysis should be conducted, depending on the type of existing forest stand: before planting, in a young stand, in a mature stand. It also defines the necessary equipment for proper sample collection and how to package and send them to the laboratory to obtain results. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/nutri%C3%A7%C3%A3o-e-fertiliza%C3%A7%C3%A3o-do-pinheiro-manso-em.html, contact: encarnacao.marcelo@iniav.pt

Folheto da colheita de amostras de solo em povoamentos de Pinheiro-manso (Portuguese)

O GO FERTIPINEA: A análise de amostras de solo recolhidas em povoamentos de pinheiro-manso permite conhecer as características físicas e químicas do solo, constituindo, juntamente com a análise foliar, suporte para a recomendação de fertilização mais adequada. A recolha de amostras de solo deve ser feita com bastante antecedência da aplicação de fertilizantes, sendo aconselhável o período em que o solo tem um teor de humidade que permita realizar esta operação. Se o terreno não for uniforme, deve ser dividido em parcelas relativamente homogéneas em termos de cor, inclinação, drenagem e tipo de gestão florestal. Assim, para sensibilizar os produtores florestais, foi preparado um folheto, disponível em papel e online, numa linguagem acessível e de fácil compreensão. O folheto define quando e como é que deve ser feita a análise, dependendo do tipo de povoamento florestal existente: antes do povoamento, num povoamento jovem, num povoamento adulto. Define também quais os equipamentos necessários para a correta recolha de amostras e como embalar e enviar para o laboratório para obter os resultados. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/nutri%C3%A7%C3%A3o-e-fertiliza%C3%A7%C3%A3o-do-pinheiro-manso-em.html, contactar: encarnacao.marcelo@iniav.pt

4.4. Tool for pine harvest prediction (English)

The OG Pinea project aims to develop a system for predicting pine cone harvests, aiming to overcome the disparity between estimates and actual harvests. The Pinea ClimaDAT application, developed in two phases, allows simulating of pine cone harvests months in advance, facilitating forest management. Key recommendations include using climate data and pine cone production models, such as Calama et al. 2016, and incorporating updated climate variables. Specific objectives include expanding the geographical validity of the application and making it compatible with public GIS data. Results include the inclusion of harvest data up to 2021, redefining natural units, and incorporating the effect of Leptoglossus occidentalis on pine cone production. However, challenges persist due to the imminent arrival of new pests or diseases, requiring ongoing adjustments to prediction models. (https://eu-cap-network.ec.europa.eu/projects/improvements-and-innovation-production-national-pine-nut_en), contact: montse.ganado@cesefor.com

Uma ferramenta para a previsão de abate de pinheiros (Portuguese)

O projeto GO Pinea tem como objetivo principal desenvolver um sistema de previsão de colheita de pinhões, visando superar a disparidade entre estimativas e colheitas reais. A aplicação Pinea ClimaDAT, desenvolvida em duas fases, permite simular colheitas de pinhões com meses de antecedência, facilitando a gestão florestal. As principais recomendações incluem o uso de dados climáticos e modelos de produção de pinhões, como o de Calama et al. 2016, além da incorporação de variáveis climáticas atualizadas. Objetivos específicos incluem expandir a validade geográfica da aplicação e torná-la compatível com dados SIG públicos. Resultados destacam-se pela inclusão de dados de colheita até 2021, a redefinição de unidades naturais e a incorporação do efeito de Leptoglossus occidentalis na produção de pinhões. Contudo, desafios persistem devido à chegada iminente de novas pragas ou doenças, exigindo ajustes contínuos nos modelos de previsão. (https://eu-cap-network.ec.europa.eu/projects/improvements-and-innovation-production-national-pine-nut_en), contact: montse.ganado@cesefor.com

4.5. Inter-territorial Association of Wild Mushroom Harvesting Professionals (English)

The OG MIKOGEST highlights the importance of sectorial associationism to professionalize the mycological sector. It proposes the creation of the Inter-territorial Association of Wild Mushroom Harvesting Professionals to coordinate activity, provide training, and ensure species conservation. Objectives include professionalizing harvesters, securely identifying edible species, and preventing indiscriminate collection. The association aims to promote the economic and social interests of harvesters, both individually and collectively. Additionally, a one- to two-year accompaniment period is recommended to ensure the success of established partnerships. This effort aims to address challenges such as lack of coordination among involved sectors and resource dispersion to unregulated sales channels, thus providing more effective and sustainable management of the mycological resource. The website https://seteros.es/ (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-go-mikogest-%E2%80%98gesti%C3%B3n-din%C3%A1mica.html), contact: montse.ganado@cesefor.com

Associação Interterritorial de Profissionais de Colheita de Cogumelos Silvestres (Portuguese)

O GO MIKOGEST destaca a importância do associativismo setorial para profissionalizar o setor micológico. Propõe a criação da Associação Interterritorial de Profissionais da Colheita de Cogumelos Silvestres para coordenar a atividade, fornecer formação e garantir a conservação das espécies. Os objetivos incluem a profissionalização dos recolhedores, a identificação segura de espécies comestíveis e a prevenção da recolha indiscriminada. Espera-se que a associação promova os interesses económicos e sociais dos recolhedores, tanto individualmente como coletivamente. Adicionalmente, recomenda-se um período de acompanhamento de um a dois anos para garantir o sucesso das parcerias estabelecidas. Este esforço visa resolver desafios como a falta de coordenação entre os setores envolvidos e a dispersão do recurso para canais de venda não regulamentados, proporcionando assim uma gestão mais eficaz e sustentável da micologia. https://seteros.es/ (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-go-mikogest-%E2%80%98gesti%C3%B3n-din%C3%A1mica.html), contactar: montse.ganado@cesefor.com

4.6. Exchange between chestnut growers (English)

The GO INGECA: During the INGECA project, chestnut producers shared experiences on innovations, and approaches to managing and producing chestnut groves, as well as exploring specific aspects such as grafting, pruning, and disease control. The activities were very helpful in engaging chestnut producers and demonstrating the effectiveness of grove management which is also economically and environmentally sustainable. The project began in 2020, right at the beginning of the Covid19 pandemic crisis, so it was decided not to conduct remote dissemination activities, but rather to wait for the end of pandemic restrictions. This favored personal contacts, allowing participants to learn about important realities of chestnut cultivation at regional and extra-regional levels, as well as practical demonstrations in the field. The chestnut production sector faces many difficulties due to environmental, social, and economic factors. These knowledge-sharing activities are essential for establishing lasting relationships among the various stakeholders in the production chain and for building stable networks capable of operating even after the project ends. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/strategie-innovative-basso-impatto-la-gestione-delle, contact: solaria.anzilotti@unifi.it

Trocas entre produtores de castanhas (Portuguese)

O GO INGECA: Durante o projeto INGECA, os produtores de castanha partilharam experiências sobre inovações, abordagens na gestão e produção de soutos, bem como explorar aspetos específicos como enxertia, poda e controlo de doenças. As atividades foram muito úteis para envolver os produtores de castanha e demonstrar a eficácia de uma gestão de souto que também é economicamente e ambientalmente sustentável. O projeto começou em 2020 exatamente no início da crise da pandemia de Covid19 e, por isso, optou-se por não realizar atividades de disseminação remotas, mas sim esperar pelo fim das restrições pandémicas. Isso favoreceu os contactos pessoais, permitiu aos participantes conhecer realidades importantes do cultivo de castanhas a nível regional e extrarregional e demonstrações práticas no campo. O setor da produção de castanha enfrenta muitas dificuldades devido a aspetos ambientais, sociais e económicos. Estas atividades de partilha de conhecimentos são fundamentais para estabelecer relações duradouras entre os múltiplos intervenientes da cadeia de produção e para construir redes estáveis, capazes de operar também após o fim do projeto. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/strategie-innovative-basso-impatto-la-gestione-delle, contactar: solaria.anzilotti@unifi.it

4.7. Integrated management of resources (water and soil) in nuts production (English)

The project on “Integrated management of resources (water and soil) in nuts production” focused on soil and water management and soil fertilization in four nut-producing species: chestnut, almond, hazel and walnut. The project also aimed to evaluate the effect of different natural and sown plant covers on nut crops to select the type of cover crop(s) best suited to each crop. Whereas traditionally, nuts are produced in dry conditions, without a special focus on soil management, fertilization, irrigation and varieties, climate change and profitability requirements create a need for applied research, field experiments and farmers' engagement. The project stated the importance of knowing site characteristics: a) in soil with poor drainage it is not possible to establish a nut orchard- improve draining capacity; b) pH can impose the most constraints to the development of nuts- correct according to the species needs; c) correct availability of organic matter; d) correct phosphorus content while correcting the ph. Alternative nutrient sources, more frequent foliar and soil analysis, adapted irrigation systems, and biodiversity pastures are among the other most suitable practices to improve nut production. Integrated management of water and soil related to nuts production (chestnut, almond, hazel and walnut) is developed by OG EGIS: ana.santos@cncfs.pt, https://egis.cncfs.pt/projeto

Luonnonvarojen (vesi ja maaperä) integroitu hallinta pähkinäntuotannossa (Finnish)

“Luonnonvarojen (vesi ja maaperä) integroitu hallinta pähkinäntuotannossa" -hankkeessa keskityttiin maaperän ja vesitalouden hoitoon sekä maaperän lannoitukseen neljässä pähkinälajissa: kastanja, manteli, hasselpähkinä ja saksanpähkinä. Hankkeen tarkoituksena oli myös arvioida erilaisten luonnollisten ja kylvettyjen kasvipeitteiden vaikutusta pähkinälajeihin kullekin sopivimpien peitekasvien valitsemiseksi. Kun perinteisesti pähkinöitä tuotetaan kuivissa olosuhteissa, ilman erityistä huomiota maaperän hoitoon, lannoitukseen, kasteluun ja lajikkeisiin, ilmastonmuutos ja kannattavuusvaatimukset luovat tarpeen soveltavalle tutkimukselle, kenttäkokeille ja viljelijöiden osallistumiselle. Hankkeessa todettiin, että on tärkeää tuntea kasvupaikan ominaisuudet: a) maaperään, josta vesi poistuu huonosti, ei ole mahdollista perustaa pähkinätarhaa – paranna vedenpoistokapasiteetttia; b) pH voi asettaa eniten rajoituksia kasvien kehitykselle - korjaa lajin tarpeiden mukaan; c) korjaa orgaanisen aineen saatavuus; d) korjaa pH;n korjauksen yhteydessä fosforipitoisuus. Vaihtoehtoiset ravinnelähteet, useammin tehty lehti- ja maaperäanalyysi, mukautetut kastelujärjestelmät ja biodiversiteettilaitumet ovat muita sopivimpia käytäntöjä pähkinöiden tuotannon parantamiseksi. Maaseudun innovaatioryhmä OG EGIS on kehittänyt veden ja maaperän integroitua hallintaa pähkinöiden (kastanja, manteli, hasselpähkinä ja pähkinä) tuotannossa: ana.santos@cncfs.pt, https://egis.cncfs.pt/projeto

4.8. Biological Treatment of cancer chestmenut in Portugal (English)

The OG BioChestnut-IBM project focused on combating chestnut cancer, caused by the fungus Cryphonectria parasitica, which poses a significant threat to chestnut trees in Portugal. After extensive research, it was found that using hypovirulent strains of this fungus was highly effective in treating the disease. Practical recommendations resulting from the project include conducting comprehensive studies on the population of C. parasitica, developing specific bioproducts to combat the disease, applying treatments with compatible strains, and continuously monitoring the effectiveness of these interventions. The success achieved is reflected in the treatment of 4028 chestnut trees and the recovery of 59452 chestnut trees, ensuring productivity for producers, as well as the sustainability and resilience of the high-value chestnut ecosystem in mountainous regions of Portugal. These practices establish a solid foundation for addressing future challenges related to chestnut cancer, ensuring the ongoing health and productivity of the trees. https://biochestnut.cncfs.pt/, contact: ana.santos@cncfs.pt

Tratamento Biológico do cancro da castanha em Portugal (Portuguese)

O projeto OG BioChestnut-IBM concentrou-se no combate ao cancro da castanha, causado pelo fungo Cryphonectria parasitica, que representa uma ameaça significativa para os castanheiros em Portugal. Após uma extensa pesquisa, foi descoberto que o uso de estirpes hipovirulentas desse fungo era altamente eficaz no tratamento da doença. Recomendações práticas resultantes do projeto incluem a realização de estudos abrangentes sobre a população de C. parasitica, o desenvolvimento de bioprodutos específicos para combater a doença, a aplicação de tratamentos com estirpes compatíveis e a monitorização contínua da eficácia dessas intervenções. O sucesso alcançado traduz-se no tratamento de 4028 castanheiros e 59452 castanheiros recuperados, garantindo assim a produtividade para os produtores, mas também a sustentabilidade e resiliência do ecossistema da castanha de elevado valor ambiental nas regiões montanhosas no interior de Portugal. Essas práticas estabelecem uma base sólida para enfrentar futuros desafios relacionados ao cancro do castanheiro, assegurando a saúde e produtividade contínuas das árvores. https://biochestnut.cncfs.pt/, contactar: ana.santos@cncfs.pt

4.9. Mobile charcoal pile prototype for biochar production in situ (English)

Mobile biochar kiln is an innovation for biochar production in situ on farms. Although the kiln has been developed for transforming wood residues from chestnut cultivation into biochar, it can be used for other types of wood residues as well. The input material for carbonization can be wood with varying diameters and lengths cut approximately to one meter, or other wood residues coming from the chestnut cultivation or other sources, such as pruning residues of fruit trees or residues of silvicultural operations. Carbonization takes place at a low to medium temperature (below 500 °C) which gives a higher biochar yield compared with rapid and/or high temperature pyrolysis systems. Biochar can be used on the farm or sold, becoming an additional source of income for the farm. Mobile biochar pile prototype is developed by OG INGECA: Solaria Anzilotti, Salvatore Moricca, Rodolfo Picchio, https://www.psingeca.it/it

Mobiilin hiiliuunin prototyyppi biohiilen tuotantoon paikan päällä (Finnish)

Mobiilibiohiiliuuni on innovaatio biohiilen tuotantoon paikan päällä maatiloilla. Vaikka uuni on kehitetty kastanjanviljelyn metsätähteiden muuntamiseen biohiileksi, sitä voidaan käyttää myös muunlaisille metsätähteille. Hiillettävä materiaali voi olla halkaisijaltaan ja pituudeltaan vaihtelevan kokoista noin metrin mittaan katkottua puuta, tai muita kastanjan viljelystä tai muista lähteistä peräisin olevia metsätähteitä, kuten muiden hedelmäpuiden karsimistähteet tai metsänhoitotoimien metsätähteet. Hiiltäminen tehdään matalassa tai keskilämpötilassa (alle 500 °C), mikä mahdollistaa korkeamman biohiilen saannon verrattuna nopeisiin ja/tai korkean lämpötilan pyrolyysijärjestelmiin. Biohiiltä voidaan käyttää tilalla tai myydä, jolloin siitä tulee tilalle lisätulonlähde. Mobiilibiohiiliuunin prototyypin on kehittänyt maaseudun innovaatioryhmä INGECA: Solaria Anzilotti, Salvatore Moricca, Rodolfo Picchio, https://www.psingeca.it/it

4.10. Methodology for plantations (English)

The ClimCast project has established a chestnut demonstration network in Portugal to study chestnut production under different climatic and soil conditions. Its objectives were: (i) to characterize the evolution of soil and climate conditions in the main producing regions in terms of chestnut production potential; (ii) to identify varieties best adapted to future climatic conditions; (iii) to develop tools for estimating future production; (iv) to develop a manual of good chestnut cultivation practices to be adopted by producers; (v) to create an alert network for chestnuts. The results highlighted the strong influence of weather conditions on chestnut production, as well as the vulnerability of chestnut trees to water and heat stress. Key recommendations include identifying varieties adapted to future climate conditions, developing tools for estimating future production, and creating a manual of good cultivation practices. Additionally, the development of climatic models to predict chestnut productivity and map climatic suitability for production was proposed. These measures aim to mitigate the impacts of climate change on chestnut production and improve the sector's resilience. https://www.citab.utad.pt/projects, contact: gpereira@utad.pt

Metodologia para plantações (Portuguese)

O ClimCast estabeleceu uma rede de demonstração de castanheiros em Portugal para estudar a produção de castanha em diferentes condições climáticas e de solo. Como objetivos, tinha: (i) caracterizar a evolução das condições de solo e clima nas principais regiões produtoras em termos de potencial para a produção de castanha; (ii) identificar as variedades melhor adaptadas às futuras condições climáticas; (iii) desenvolver ferramentas para estimar a produção futura; (iv) desenvolver um manual de boas práticas de cultivo de castanha a ser adotado pelos produtores; (v) criar uma rede de alerta para castanhas. Os resultados destacaram a forte influência das condições meteorológicas na produção de castanha, bem como a vulnerabilidade dos castanheiros ao stress hídrico e térmico. Recomendações principais incluem a identificação de variedades adaptadas às condições climáticas futuras, o desenvolvimento de ferramentas para estimar a produção futura, e a criação de um manual de boas práticas de cultivo. Além disso, foi proposto o desenvolvimento de modelos climáticos para prever a produtividade da castanha e mapear a adequação climática para a sua produção. Essas medidas visam mitigar os impactos das alterações climáticas na produção de castanha e melhorar a resiliência do setor. https://www.citab.utad.pt/projects, contactar: gpereira@utad.pt

4.11. Valorization of a neglected plant (English)

The OG SambucusValor (https://sambucusvalor.pt/) aimed to develop value-added food products from elderberries, focusing on sustainable cultivation management. Its main recommendations included defining quality indicators, implementing stabilization and storage processes, creating new products, and forming partnerships for dissemination. Objectives encompassed establishing a pilot center and national/international product promotion. Key achievements comprised quality indicator definition, product stabilization, new food development, network creation, and collaboration with Galicia. Results were disseminated through various technical and scientific publications, promoting innovation and sustainable development in the elderberry value chain. Contact: inovterra@gmail.com

Valorização de uma planta negligenciada (Portuguese)

O GO SambucusValor (https://sambucusvalor.pt/) visa desenvolver produtos alimentares de valor acrescentado a partir de sabugueiros, com foco na gestão sustentável do cultivo. As suas principais recomendações incluíram a definição de indicadores de qualidade, implementação de processos de estabilização e armazenamento, criação de novos produtos e parcerias para divulgação. Os objetivos abrangiam a criação de um centro piloto e a disseminação nacional e internacional dos produtos. As principais realizações compreenderam a definição de indicadores de qualidade, a estabilização dos produtos, o desenvolvimento de novos alimentos, a criação de uma rede de divulgação e parcerias, além da colaboração com a Galiza. Os resultados foram divulgados por meio de diversas publicações técnicas e científicas, promovendo a inovação e o desenvolvimento sustentável na cadeia de valor do sabugueiro. Contactar: inovterra@gmail.com

4.12. Mechanised cork extraction method (English)

The OG SUBER, from 2018 to 2020, aimed to improve cork extraction efficiency by focusing on mechanization and modernization of the process. Key recommendations included the introduction of electrical machinery and enhancing health and safety practices. The main objective was to make cork extraction more attractive and safer, addressing challenges such as the scarcity of skilled labor and an ageing workforce. Results highlighted a mechanical guide for cork extraction as the main achievement. The future path involves raising further awareness of occupational safety, professionalizing the sector, and ensuring support to enable technological advances, with the goal of completely phasing out manual extraction methods. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-resinlab-para-la-creaci%C3%B3n-de.html), contact: m.bejarano@trevincaingenieria.com

Método de extração mecanizada da cortiça (Portuguese)

O GO SUBER, de 2018 a 2020, visou melhorar a eficiência da tiragem da cortiça, focando a mecanização e modernização do processo. Recomendações-chave incluíram a introdução de máquinas elétricas e aprimoramento das práticas de segurança e saúde. O objetivo principal foi tornar a recolha da cortiça mais atrativa e segura, enfrentando desafios como a escassez de mão-de-obra especializada e o envelhecimento da força de trabalho. Os resultados destacaram um guia mecânico para a tiragem da cortiça como principal realização. O caminho futuro envolve uma maior conscientização sobre segurança ocupacional, a profissionalização do setor e apoios para viabilizar avanços tecnológicos, visando à completa eliminação do método manual. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-resinlab-para-la-creaci%C3%B3n-de.html), contactar: m.bejarano@trevincaingenieria.com

4.13. Quality cork guide (English)

The OG SUBER, developed from 2018 to 2020, has been aimed at improving cork harvesting efficiency and exploring alternative uses beyond wine corking, such as in the aeronautical industry and cosmetics. Its recommendations emphasise diversifying cork uses to maximise its economic value and preserve cork oak ecosystems. Key objectives included creating skilled jobs and combating rural depopulation. Results were consolidated into a guide for new cork applications, showcasing its economic and ecological potential. However, the increasing valorisation of cork, due to declining cork oak forests and advancements in wine stopper technology, poses challenges for its application outside the wine market. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/go-suber-modernizaci%C3%B3n-global-del-sector-de-la.html), contact: m.bejarano@trevincaingenieria.com

Guia de qualidade da cortiça (Portiguese)

O GO SUBER, de 2018 a 2020, visou melhorar a eficiência da colheita de cortiça e explorar novos usos para além das rolhas de vinho, como na indústria aeronáutica e cosméticos. As suas recomendações destacam a diversificação dos usos da cortiça para maximizar seu valor económico e conservar os ecossistemas. Os principais objetivos incluíram a criação de empregos qualificados e o combate do abandono rural. Os resultados foram consolidados num guia de novos usos da cortiça, demonstrando o seu potencial económico e ecológico. No entanto, o aumento da valorização da cortiça, devido ao declínio dos montados de sobro e à tecnologia de rolhas de vinho, cria desafios para sua aplicação em outros setores além do vinho. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/go-suber-modernizaci%C3%B3n-global-del-sector-de-la.html), contactar: m.bejarano@trevincaingenieria.com

4.14. Mechanised resin extraction method (English)

The OG ACREMA's main recommendations are to improve resin extraction methods, such as the use of the borehole at height method, which has been shown to increase yields of P. pinaster and P. radiata. The objectives focus on obtaining a purer raw material with less physical effort and greater efficiency. The results indicate that the borehole at height method outperforms other traditional techniques in terms of yield, even without the application of stimulants. However, high punch productions stand out, especially in non-stimulated trees, reaching productions of 1,796 g for P. pinaster and 1,162 g for P. radiata. This method proves particularly effective in stands intended for mechanical debarking. However, long-term studies are needed to validate the effectiveness of these methods in different scenarios, considering environmental and human variables. Effective communication between field workers and researchers is crucial to ensure the credibility of the data and the realistic implementation of research projects. (https://eu-cap-network.ec.europa.eu/projects/adaptaation-resin-activity-pinewoods-wood-producing-purposes_en), contact: erikamc@foresin.es

Método mecanizado de extração de resina (Portuguese)

As principais recomendações do grupo operacional ACREMA consistem em melhorar os métodos de extração de resina, através do uso do método de furo em altura, que demonstrou aumentar os rendimentos de P. pinaster e P. radiata. Os objetivos centram-se na obtenção de uma matéria-prima mais pura com menor esforço físico e maior eficiência. Os resultados indicam que o método de furo em altura supera outras técnicas tradicionais em termos de rendimento, mesmo sem a aplicação de estimulantes. Contudo as altas produções de furo destacam-se, especialmente nas árvores não estimuladas, atingindo produções de 1.796 g para P. pinaster e 1.162 g para P. radiata. Este método mostra-se particularmente eficaz em povoamentos destinados à desramação mecânica. No entanto, são necessários estudos a longo prazo para validar a eficácia desses métodos em diferentes cenários, considerando as variáveis ambientais e humanas. A comunicação eficaz entre os trabalhadores de campo e os investigadores é fundamental para garantir a credibilidade dos dados e a implementação realista dos projetos de investigação. (https://eu-cap-network.ec.europa.eu/projects/adaptaation-resin-activity-pinewoods-wood-producing-purposes_en), contactar: erikamc@foresin.es

4.15. Wood-resin compatibility model (English)

The OG GO ACREMA: The results of the study on the use of resin in three species of pine trees (Pinus pinaster Ait., Pinus radiata D. Don, and Pinus nigra Arnold) from Galicia reveal that resin extraction does not negatively affect the mechanical properties of wood. Analyses show that there are no significant differences in strength and stiffness between the wood of resin-extracted and non-extracted pine trees. Additionally, an increase in wood density was observed in resin-tapped stands, which may represent a structural advantage. Forestry professionals are recommended to consider including resin extraction as an additional service in forest management. This can generate regular economic benefits without compromising wood quality. Implementing these findings can diversify forest income sources and create social value for local communities. In this context, there is an interest in including resin extraction as an ecosystem service added to the management of Galician mountains, initially planted solely for wood use. https://www.acrema.es/proyecto.php, contact: erikamc@foresin.com

Modelo de compatibilidade madeira-resina (Portuguese)

O GO GO ACREMA: Os resultados do estudo sobre a utilização de resina em três espécies de pinheiros ((Pinus pinaster Ait., Pinus radiata D. Don e Pinus nigra Arnold) da Galiza revelam que a resinagem não afeta negativamente as propriedades mecânicas da madeira. As análises mostram que não há diferenças significativas na resistência e rigidez entre a madeira de pinheiros com ou sem extração. Além disso, observou-se um aumento na densidade da madeira em povoamentos resinados, o que pode representar uma vantagem estrutural. Recomenda-se aos profissionais florestais considerar a inclusão da atividade de extração de resina como um serviço adicional na gestão das florestas. Isso pode gerar benefícios económicos regulares, sem comprometer a qualidade da madeira. A implementação dessas descobertas pode diversificar as fontes de rendimento florestal e criar valor social para as comunidades locais. Neste contexto, existe um interesse em incluir a atividade de extração de resina como um serviço ecossistémico adicionado à gestão das montanhas galegas, inicialmente plantadas apenas para uso de madeira. https://www.acrema.es/proyecto.php, contactar: erikamc@foresin.com

4.16. New cork uses guide (English)

The Gosuber project, developed from 2018 to 2020, aimed to improve cork harvesting efficiency and establish procedures for quality classification. Its main recommendations include the application of information technologies in subericulture for more effective management of cork oak forests. Results were consolidated into a guide detailing the studies conducted and their applications in cork classification. The potential for technological innovation to determine cork qualities in the field promises to democratize product sales standards. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/go-suber-modernizaci%C3%B3n-global-del-sector-de-la.html), contact: m.bejarano@trevincaingenieria.com

Novo guia de utilizações da cortiça (Portuguese)

O projeto Gosuber, desenvolvido de 2018 a 2020, teve como principal objetivo melhorar a eficiência da tiragem de cortiça e estabelecer procedimentos da classificação da sua qualidade. As principais recomendações incluem a aplicação de tecnologias de informação na subericultura para uma gestão mais eficaz dos montados de sobro. Os resultados foram consolidados num guia que detalha os estudos realizados e suas aplicações na classificação da cortiça. O potencial de inovação tecnológica para determinar as qualidades da cortiça no campo promete democratizar os padrões de vendas do produto. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/go-suber-modernizaci%C3%B3n-global-del-sector-de-la.html), contactar: m.bejarano@trevincaingenieria.com

4.17. Establishing new business models with NWFP (English)

The project "Sustainable Bee Forest" develops and implements a new forest management concept that improves the habitat of flower-pollinating insects during reforestation and afforestation. Besides wood production, emphasis is placed on the production of honey and other non-wood forest products including berries and nuts in bee-friendly forest habitats. The project aims at building better linkages between profitability and conservation aspects of forest management. At the same time, the aim is to diversify and generate new income sources from non-wood forest products for forest owners, many of which are challenged with forest dieback due to climate change. The product innovation – honey, berries, and nuts from managed forests with bee-friendly species – is based on a solid research base. The OG “Sustainable Bee Forest” conducts monitoring and evaluation studies and collaborates with the University of Göttingen to analyze the economic potential of honey as a non-wood forest product. Such research is lacking in the region and is needed for creating a solid knowledge base for interested forest owners, forest managers, and administration. The new business models based on non-wood forest products in the state of Hesse in Germany are developed by OG Bienwald: Comunis Projektbüro, Judith Treis, info@comunis-projektbuero.de, www.bienenwald-hessen.de

Uusien metsien ei-puuaineisiin tuotteisiin perustuvien liiketoimintamallien luominen (Finnish)

Sustainable Bee Forest -hankkeessa kehitetään ja toteutetaan uusi metsänhoitokonsepti, joka parantaa kukkia pölyttävien hyönteisten elinympäristöä uudelleenmetsityksessä ja metsityksessä. Puuntuotannon lisäksi painopiste on hunajan ja muiden metsien ei-puuaineisten tuotteiden, kuten marjojen ja pähkinöiden, tuotannossa mehiläisystävällisissä metsäympäristöissä. Hankkeen tavoitteena on luoda parempia yhteyksiä metsänhoidon kannattavuuden ja suojelun välille. Samalla tavoitteena on monipuolistaa ja tuottaa uusia metsien ei-puuaineisiin tuotteisiin liittyviä tulonlähteitä metsänomistajille, joista monia uhkaa metsien kuoleminen ilmastonmuutoksen vuoksi. Tuoteinnovaatio – hunaja, marjat ja pähkinät hoidetuista metsistä, joissa on mehiläisille sopivia lajeja – perustuu vankkaan tutkimuspohjaan. Maaseudun innovaatioryhmä "Sustainable Bee Forest" tekee seuranta- ja arviointitutkimuksia sekä tekee yhteistyötä Göttingenin yliopiston kanssa hunajan taloudellisen potentiaalin analyysissa metsien ei-puuaineisena tuotteena. Tällainen tutkimus puuttuu alueelta ja sitä tarvitaan vankka tietopohja luomiseksi tietämyksen siirtämiseksi kiinnostuneille metsänomistajille, metsien hoitajille ja hallinnolle. Uudet metsien ei-puuaineisiin tuotteisiin perustuvat liiketoimintamallit Hessenin osavaltiossa Saksassa on kehittänyt maaseudun innovaatioryhmä OG Bienwald: Comunis Projektbüro, Judith Treis, info@comunis-projektbuero.de, www.bienenwald-hessen.de

4.18. Interactive Pinus pinaster resin production simulator (English)

In southern Europe, maritime pine resin is one of the main non-timber forest products. One of the aims of GO ACREMA (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/adaptaci%C3%B3n-de-la-actividad-resinera-masas-de-pino.html) in Spain was to create a dynamic model to estimate the accumulated resin yield during the resin production season. A decision support system has been developed, consisting of two parts : an interactive simulator with the production models and a web GIS with the auxiliary variables and resin production maps. These models were implemented in a web tool accessible to all users, in order for them to obtain an estimate of the resin production within their plot. In addition, the production maps elaborated in the interactive application can be consulted on the web GIS. Maps were drawn up for each area of action, and the maximum yields obtained were indicated. The yields were classified according to a stratified scale in four groups, in which darker colors indicate a higher maximum resin. The results of this study make it possible to add the cumulative annual resin yield of maritime pine to the processes that the Bertalanffy- iRichards equation is capable of modeling. The great versatility of these models will be of great use to the forest manager in optimiszing the annual harvesting season as well as to the scientific community. Contact: erikamc@foresin.com

Simulateur interactif de production de résine de Pinus pinaster (French)

Dans le sud de l'Europe, la résine de pin maritime est l'un des principaux produits forestiers non ligneux. Un des objectifs de GO ACREMA en Espagne (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/adaptaci%C3%B3n-de-la-actividad-resinera-masas-de-pino.html), était de créer un modèle dynamique d'estimation du rendement de résine pendant la saison. Un système d'aide à la décision composé de deux parties a été développé : un simulateur interactif avec les modèles de production et un SIG avec les variables auxiliaires et les cartes de production de résine. Ces modèles ont été implémentés dans un outil web accessible à tous les utilisateurs, afin qu'ils puissent obtenir une estimation de la production de résine au sein de leur parcelle. Des cartes ont été établies pour chaque domaine d'action et les rendements maximaux obtenus ont été indiqués. Les rendements ont été classés selon une échelle stratifiée en quatre groupes, dans lesquels les couleurs plus foncées indiquent une résine maximale plus élevée. Les résultats de cette étude permettent d'ajouter le rendement cumulatif annuel en résine du pin maritime au modèle issu de l'équation de Bertalanffy-iRichards. La polyvalence de ces modèles sera d'une grande utilité à l'aménagiste forestier pour optimiser la saison annuelle de récolte ainsi qu'à la communauté scientifique. Contact : erikamc@foresin.com

4.19. Diversification of edible wild mushroom cultivation with new native species (English)

The OG TEb Verd / BoletBenFet aimed to diversify edible mushroom cultivation in Catalonia by incorporating native and lignicolous species. Cultivation methods were established for eight species, including some never cultivated, such as Fistulina hepatica and Lyophyllum decastes. A culture bank with 120 strains was created for future research. Seed production was made viable for 11 species. Nutrient and cytotoxicity analyses are in progress. Though the complete cultivation cycle has yet to be achieved for Laetiporus sulphureus, interest in the species persists, with ongoing research. Diversifying mushroom cultivation promises to increase diversity and commercial supply, giving local producers a competitive advantage and opening new export opportunities. Cooperation between companies, research centers, and governmental support was crucial for the project's success. (https://www.irta.cat/ca/el-cultiu-dels-bolets-de-soca-autoctons-cami-de-ser-una-realitat/), contact: tebverd@teb.org

Diversificação do cultivo de cogumelos silvestres comestíveis com novas espécies nativas (Portuguese)

Os grupos operacionais TEb Verd / BoletBenFet tiveram como objetivo diversificar o cultivo de cogumelos comestíveis na Catalunha, incorporando espécies nativas e lignícolas. Foram estabelecidos métodos de cultivo para oito espécies, incluindo algumas nunca cultivadas, como Fistulina hepatica e Lyophyllum decastes. Um banco de culturas com 120 estirpes foi criado para uma futura pesquisa. A produção de sementes foi viabilizada para 11 espécies. Análises de nutrientes e citotoxicidade estão a ser desenvolvidas. Embora o ciclo completo de cultivo ainda não tenha sido alcançado para Laetiporus sulphureus, o interesse na espécie continua, com pesquisa a avançar. A diversidade no cultivo de cogumelos promete aumentar a diversidade e a oferta comercial, conferindo vantagem competitiva aos produtores locais e abrindo novas oportunidades de exportação. A cooperação entre empresas, centros de pesquisa e apoio governamental foi fundamental para o sucesso do projeto. (https://www.irta.cat/es/el-cultivo-de-hongos-lignicolas-autoctonos-camino-de-ser-una-realidad/), contactar: tebverd@teb.org

4.20. Improving productivity and sustainability of black truffle plantations by microbiological handling of the rhizosphere (English)

Black truffle production in Catalonia is with high economic potential. One problem to be solved in trucficulture is crop irregularity. As a major difference from the cultivation of trees for biomass, in this case, we work with a much more complex interaction between the tree and the rhizosphere. However, the increase of monospecific plantations (generally holm oaks) can cause an increase in certain diseases and pests that decrease the production of truffles. Management of the rhizosphere can contribute to the general improvement of plant vigor and its tolerance to biotic factors without the need to use phytosanitary products. In this project researchers evaluated the capacity of different organic substances and rhizobacteria, some isolated from wild truffles (Vilanova et al 2013) with the intention of improving the biotic and abiotic conditions of the rhizosphere, considering the presence and availability of nutrients. The follow-up of the fungus response was carried out in collaboration with IRTA, using the technology and results of the innovative pilot project. These techniques are based on quantitative PCR and allow to determine the mycelium biomass of a fungal species, in this case Tuber melanosporum, in a soil sample (Parladé et al. 2013). There is not enough data to extract solid conclusions. Contacts: https://boscat.cat/#contact Contact information: marcosmorcillo@micofora.com

Melno trifeļu stādījumu produktivitātes un ilgtspējas uzlabošana (Latvian)

Melno trifeļu audzēšana Katalonijā ir ar augstu ekonomisko potenciālu, jo īpaši lauksaimniecības apgabalos ar zemu ražību. Tomēr problēma, kas jārisina trifeļu audzēšanā, ir ražas neregularitāte Būtiska atšķirība no koku audzēšanas biomasas iegūšanai ir tā, ka Ir jāsaskaras ar daudz sarežģītāku mijiedarbību starp koku un rizosfēru jeb saskarsmes zonu starp auga saknēm un augsni. Tomēr monospecifisko stādījumu (parasti ozolu) palielināšana var izraisīt noteiktu slimību un kaitēkļu izplatību, kas samazina trifeļu ražošanu. Rizosfēras kontrole var veicināt vispārēju augu dzīvības un tolerances pret biotiskajiem faktoriem uzlabošanos, neizmantojot fitosanitāros produktus. Šajā projektā pētnieki novērtēja dažādu organisko vielu un rizobaktēriju kapacitāti, no kurām dažas izolētas no savvaļas trifelēm (Vilanova et al (2013), ar nolūku uzlabot rizosfēras biotiskos un abiotiskos apstākļus, ņemot vērā barības vielu klātbūtni un pieejamību. Sēnīšu reakcijas uzraudzība tika veikta sadarbībā ar IRTA, izmantojot novatoriskā pilotprojekta tehnoloģiju un rezultātus. Šīs metodes ir balstītas uz kvantitatīvo PCR un ļauj augsnes paraugā noteikt sēnīšu sugas, šajā gadījumā Tuber melanosporum, micēlija biomasu (Parladé et al. 2013). Pētījumā netika iegūts pietiekami daudz datu, lai izdarītu pārliecinošus secinājumus. Kontakti: https://boscat.cat/#contact Kontaktinformācija: marcosmorcillo@micofora.com

4.21. Development of a system to remove TCA from cork stoppers using adsorbents and biosorbents (English)

The OG TCA aims to develop innovative systems to remove unwanted aromas from cork stoppers, enhancing the competitiveness of the cork industry. Key recommendations include using recovered activated carbons for removing defective aromas, applicable in both aqueous and dry environments, with a shelf life exceeding six months. The objective is to tackle the competition from alternative stoppers by reducing issues associated with aromas. Results encompass two effective aroma removal systems, one for natural cork stoppers and another for agglomerated cork, capturing 50-95% of undesirable compounds under laboratory conditions. These systems, based on adsorbents with high affinity for aromas, promote efficiency without major alterations to existing processes. (https://www.icsuro.com/projectes/sistema-deliminacio-dhaloanisols-tca-i-altres-aromesdefectuosos/) (https://www.icsuro.com/la-bioabsorcio-daromes-suro) contact: jpuig@ollerfco.com

Desenvolvimento de um sistema para remoção de TCA de rolhas de cortiça utilizando adsorventes e biossorventes (Portugueses)

O grupo operacional TCA visa desenvolver sistemas inovadores para remoção de aromas indesejados nas rolhas de cortiça, melhorando a competitividade da indústria corticeira. As principais recomendações incluem o uso de carvões ativados recuperados para remoção de aromas inconvenientes, aplicáveis em ambientes aquosos e secos, com uma vida útil superior a seis meses. O objetivo é enfrentar a concorrência de rolhas alternativas, reduzindo problemas associados aos aromas. Os resultados incluem dois sistemas de remoção de aromas eficazes, um para rolhas de cortiça natural e outro para cortiça aglomerada, capturando 50-95% dos compostos indesejados em condições laboratoriais. Esses sistemas, baseados em adsorventes com alta afinidade para aromas, promovem a eficiência sem grandes alterações nos processos existentes. (https://www.icsuro.com/projectes/sistema-deliminacio-dhaloanisols-tca-i-altres-aromesdefectuosos/) (https://www.icsuro.com/la-bioabsorcio-daromes-suro) contactar: jpuig@ollerfco.com

4.22. Effect of oxygen transfer in the different manufacturing conditions of cork stoppers in still and sparkling wine (English)

The main recommendations of the OG OTR include assessing oxygen transfer during cork production, applying control measures based on results, and preparing a catalogue of corks with different transfer rates. Objectives involve understanding the effect of oxygen transfer rate on wine and fostering relations between the cork sector and winemaking industry. Results emphasize selecting the appropriate cork type to control wine aging and adjusting production for consistent oxygen transfer. For more information, you can consult the following link: https://icsuro.com/ contact: teresa@jvigas.com

Efeito da transferência de oxigénio nas diversas condições de fabrico de rolhas de cortiça em vinhos e espumantes (Portuguese)

As principais recomendações do grupo operacional OTR incluem a avaliação da transferência de oxigénio durante a produção de rolhas de cortiça, a aplicação de medidas de controlo com base nos resultados obtidos e a preparação de um catálogo de rolhas com diferentes taxas de transferência. Os objetivos consistem em compreender o efeito da taxa de transferência de oxigénio no vinho e fomentar relações entre o setor da cortiça e a indústria vinícola. Os resultados destacam a importância de selecionar o tipo adequado de rolha de cortiça para controlar o processo de envelhecimento do vinho e a necessidade de ajustar a produção para garantir a consistência na transferência de oxigénio. Para mais informações, você pode consultar o seguinte link: https://icsuro.com/ contactar: teresa@jvigas.com

ITHub 5 – Agroforestry (9 PAs)

5.1. Improve producers' knowledge about the natural regeneration processes of cork oaks and holm oaks in agro-forestry systems (English)

The OG Oak Regeneration aimed to understand and promote the natural regeneration of cork oak and holm oak forests. One of the main identified threats was the lack of natural regeneration, exacerbated by climate change and inadequate management practices. Partnerships with producers and agroforestry associations were established, implementing 14 demonstration areas to monitor regeneration dynamics. Recommendations included temporarily excluding agricultural and grazing activities in specific areas to allow for natural regeneration. Results revealed that while fruiting and germination phases did not pose significant issues, the main obstacle occurred in the transition from initial regeneration to growth into mature trees. The results highlighted challenges in the transition from initial regeneration to growth into mature trees. As a key outcome, a Management Techniques Manual for Natural Regeneration Areas was developed, available online and in physical format, to guide agroforestry producers on best management practices. This manual aims to improve understanding and implementation of techniques that favor natural regeneration, protecting and promoting biodiversity and economic sustainability of cork oak and holm oak forests. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/oak%C2%AEegeneration.html), contact: augusta.costa@iniav.pt

Melhorar o conhecimento dos produtores sobre os processos de regeneração natural dos sobreiros e azinheiras em sistemas agroflorestais (Portuguese)

O GO Oak Regeneration teve como objetivo principal compreender e promover a regeneração natural dos montados de sobro e azinho. Uma das principais ameaças identificadas foi a falta de regeneração natural, agravada pelas mudanças climáticas e práticas de gestão inadequadas. Parcerias com produtores e associações agroflorestais foram estabelecidas, implementando 14 áreas de demonstração para monitorizar a regeneração. Recomendações incluíram a exclusão temporária de atividades agrícolas e de pastoreio em áreas específicas para permitir a regeneração natural. Os resultados revelaram que, embora as fases de frutificação e germinação não apresentassem problemas significativos, o principal obstáculo ocorria na transição entre a regeneração inicial e o crescimento para se tornarem árvores adultas. Os resultados destacaram desafios na transição entre a regeneração inicial e o crescimento para árvores adultas. Como resultado chave, foi desenvolvido um Manual de Técnicas de Gestão para Áreas de Regeneração Natural, disponível online e em formato físico, para orientar os produtores agroflorestais sobre as melhores práticas de gestão. Este manual visa melhorar a compreensão e implementação de técnicas que favoreçam a regeneração natural, protegendo e promovendo a biodiversidade e sustentabilidade económica dos montados de sobro e azinho. (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/oak%C2%AEegeneration.html), contactar: augusta.costa@iniav.pt

5.2. “Agroforestry in Austria” Network (English)

The multi-actor "Agroforestry in Austria" network consists of stakeholders interested in agroforestry. In the project six farms established agroforestry systems on their land. As there are only few agroforestry examples in Austria, these farms are agroforestry pioneers and serve as important examples of agroforestry to other farms interested in establishing agroforestry practices on their farm. The benefits of the agroforestry network include serving as a contact point for questions and issues related to agroforestry, enhance interest and demand from practitioners, awareness among decision-makers for agroforestry as a land management option and pulling relevant agroforestry knowledge for Austria together. Also networking and opportunities to meet like-minded people can increase certainty of farmers to implement agroforestry systems. Besides the network serving as a knowledge transfer point for practical, scientific and advisory expertise, foreign know-how is channeled and made available to Austrian stakeholders. Communication activities are therefore a key to the network. The “Agroforestry in Austria” Network is developed by the operational group Agroforst in Österreich (Agroforestry in Austria): Theresia Markut, theresia.markut@fibl.org, https://www.youtube.com/watch?v=-NVTYmE4e7o (in German)

Agrometsätalous Itävallassa -verkosto (Finnish)

Monitoimijainen Agrometsätalous Itävallassa -verkosto koostuu agrometsätaloudesta kiinnostuneista sidosryhmistä. Hankkeessa kuusi maatilaa perusti mailleen agrometsätalousjärjestelmiä. Nämä tilat ovat agrometsätalouden edelläkävijöitä ja toimivat tärkeinä agrometsätalouden esimerkkeinä muille tiloille, jotka ovat kiinnostuneita ottamaan käyttöön agrometsäviljelykäytäntöjä tilallaan, koska Itävallassa on vain satunnaisia esimerkkejä agrometsätaloudesta, Agrometsätalousverkoston etuja ovat muun muassa yhteyspisteenä toimiminen agrometsätalouteen liittyviä kysymyksiä ja kysymyksiä varten, ammattilaisten kiinnostuksen ja kysynnän lisääntyminen, päättäjien tietoisuus agrometsätaloudesta maankäyttövaihtoehtona ja Itävaltaa koskevan agrometsätaloustiedon yhteenkokoaminen. Myös verkostoituminen ja mahdollisuudet tavata samanhenkisiä ihmisiä voivat lisätä viljelijöiden varmuutta agrometsätalousjärjestelmien toteuttamisessa. Sen lisäksi, että verkosto toimii käytännön tiedon, tieteellisen tiedon ja neuvontaa koskevan asiantuntemuksen tiedonsiirtopisteenä, verkoston kautta kanavoidaan ja tehdään saataville ulkomaista tietotaitoa itävaltalaisten sidosryhmien käyttöön. Viestintätoimet ovatkin avainasemassa verkostossa. "Agrometsätalous Itävallassa" -verkoston on kehittänyt toimintaryhmä Agroforst in Österreich (Agrometsätalous Itävallassa): Theresia Markut, theresia.markut@fibl.org, https://www.youtube.com/watch?v=-NVTYmE4e7o (saksaksi)

5.3. Agroforestry "Farminar" as new mode of knowledge transfer (English)

A farminar is a term composed of a blend of a "farm" and an "online seminar". In a farminar experts report directly from a farm, field or forest plot and present agroforestry work practices or equipment from practical relevance perspectives. As a dynamic knowledge transfer method, stakeholders can participate in farminars both on site and online and ask questions via chat. Farminars are also recorded and posted online. Agroforestry farminars facilitate knowledge transfer to various stakeholder groups, such as practitioners and government agencies. The farminar format has been originally formulated by an Austrian training institution for rural development. The agroforestry farminar is the first of its kind and it is developed by Agroforst in Österreich (Agroforestry in Austria), project coordinator Theresia Markut, theresia.markut@fibl.org, https://www.youtube.com/watch?v=9HwseLy14vw (in German)

Agrometsätalousfarminaari uutena tiedonsiirtomuotona (Finnish)

Farminar koostuu terminä "maatilasta" ja "verkkoseminaarista". Farminaarissa asiantuntijat raportoivat suoraan maatilalta, pellolta tai metsäpalstalta ja esittelevät agrometsätalouden työkäytäntöjä tai laitteita käytännön relevanssin näkökulmasta. Dynaamisena tiedonsiirtomenetelmänä sidosryhmät voivat osallistua farminaareihin sekä paikan päällä että verkossa ja esittää kysymyksiä chatin kautta. Farminaarit tallennetaan ja julkaistaan myös verkossa. Agrometsätalousfarminaarit mahdollistavat tietämyksen siirron eri sidosryhmille, kuten ammattilaisille ja valtion virastoille. Farminaari-formaatin on alun perin kehittänyt itävaltalainen maaseudun kehittämisen koulutuslaitos. Agrometsätalousfarminaari on ensimmäinen laatuaan, ja sen on kehittänyt Agroforst in Österreich (Agrometsätalous Itävallassa) -hanke: Theresia Markut, theresia.markut@fibl.org, https://www.youtube.com/watch?v=9HwseLy14vw (saksaksi)

5.4. New and innovative cultivation methods of highly productive apples adapted to northern climates (English)

To make apple production profitable the focus has to be on quality and value chain rather than tonnage. The profitability for the farmers in the project comes from the connection to an enterprise producing high value ice cider and operating in a global premium market. The project aims to develop new cultivation methods, new varieties, planting arrangements and management options to meet the demands of a new kind of buyer that rewards quality over quantity. This inspires farmers to go beyond business as usual in their operations and traditional agriculture in the area. Each farmer also finds their own way of managing their apple orchard – the whole idea is to learn new things for the future and do observations to do things better in terms of growing apples with high sugar content suitable for ice cider production in Northern Europe. The long-term goal of the project is to contribute to climate resilient sustainable agriculture and to create favourable partnerships between farmers and food processing companies to develop further products in local, regional and global markets. The new and innovative cultivation methods of highly productive apples are developed by "Commercial productive apple growing in a northern climate – innovation for new climate resilient agriculture in northern Europe" project in Sweden: Daniel Pacurar (danielpacurar@borealorchards.se), https://www.brannlandcider.se/om-oss/vara-odlingar/commercial-productive-apple-growing-in-a-northern-climate/

Uudet ja innovatiiviset pohjoisiin ilmastoihin sopeutuneiden korkeatuottoisten omenoiden viljelymenetelmät (Finnish)

Jotta omenantuotanto olisi kannattavaa, painopisteen on oltava laadussa ja arvoketjussa tonnimäärän sijaan. Hankkeen viljelijöiden kannattavuus perustuu yhteyteen arvokasta jääsiideriä tuottavaan yritykseen, joka toimii globaaleilla premium-markkinoilla. Hankkeen tavoitteena on kehittää uusia viljelymenetelmiä, uusia lajikkeita, istutusjärjestelmiä ja hoitovaihtoehtoja vastaamaan uudenlaisen ostajan vaatimuksia, joka palkitsee laadusta määrän sijaan. Tämä kannustaa viljelijöitä menemään toiminnassaan tavanomaista pidemmälle ja alueen perinteistä maataloutta pidemmälle. Jokainen viljelijä löytää myös oman tapansa hoitaa omenatarhaansa – koko ideana on oppia uutta tulevaisuutta varten ja tehdä havaintoja asioiden tekemiseksi paremmin jääsiiderin tuotantoon soveltuvien sokeripitoisten omenoiden kasvattamisessa Pohjois-Euroopassa. Hankkeen pitkän aikavälin tavoitteena on edistää ilmastokestävää kestävää maataloutta ja luoda myönteisiä kumppanuuksia viljelijöiden ja elintarvikkeiden jalostusyritysten välille uusien tuotteiden kehittämiseksi paikallisilla, alueellisilla ja globaaleilla markkinoilla. Korkeatuottoisten omenoiden uusia ja innovatiivisia viljelymenetelmiä kehittää "Commercial productive apple growing in a northern climate – innovation for new climate resilient agriculture in Northern Europe" -hanke Ruotsissa: Daniel Pacurar (danielpacurar@borealorchards.se), https://www.brannlandcider.se/om-oss/vara-odlingar/commercial-productive-apple-growing-in-a-northern-climate/

5.5. School of Agroforestry (English)

Agroforestry Network in Tuscany promotes traditional agroforestry knowledge and innovative solutions for the implementation of sustainable agroforestry systems. In 2022, the network organized an agroforestry school, a training event on agroforestry, for stakeholders interested in agroforestry. The agroforestry school consisted of five training modules, each lasting one day and consisting of both classroom lessons and field visits. The topics covered included agroforestry and forestry systems, forestry management and grazing, soil, certification, and marketing. The agroforestry school promotes agroforestry as a promising land use system for facilitating farmers' presence in marginal rural areas and as one income source for farmers. While promoting agroforestry, the agroforestry school also serves as an important link to different stakeholders creating an understanding of their needs for knowledge and information and as a platform for facilitating networking of farmers in sustainable farming. The School of Agroforestry has been arranged by the NEWTON project (Agroforestry Network in Tuscany): Solaria Anzilotti (solaria.anzilotti@unifi.it), https://gonewton.it

Agrometsätalouskoulu (Finnish)

Toscanan agrometsätalousverkosto edistää perinteistä agrometsätalouden tietämystä ja innovatiivisia ratkaisuja kestävien agrometsätalousjärjestelmien toteutuksessa. Vuonna 2022 verkosto järjesti agrometsätalouskoulun, agrometsätalouden koulutustapahtuman, agrometsätaloudesta kiinnostuneille sidosryhmille. Agrometsätalouskoulu koostui viidestä koulutusmoduulista, joista jokainen kesti yhden päivän koostuen luokassa pidetyistä oppitunneista ja maastovierailuista. Käsiteltäviä aiheita olivat agrometsätalous- ja metsätalousjärjestelmät, metsänhoito ja laiduntaminen, maaperä, sertifiointi ja markkinointi. Agrometsätalouskoulu tuo agrometsätaloutta esille lupaavana maankäyttöjärjestelmänä viljelijöiden läsnäolon edistämiseksi marginaalisilla maaseutualueilla ja yhtenä viljelijöiden tulonlähteenä. Samalla kun agrometsätalouskoulu edistää agrometsätaloutta, se toimii myös tärkeänä linkkinä eri sidosryhmiin luoden käsitystä agrometsätalouteen liittyvistä tietotarpeista ja alustana viljelijöiden verkostoitumiseen kestävässä maataloudessa. Agrometsätalouskoulun on järjestänyt NEWTON-hanke (Agroforestry Network in Toscany): Solaria Anzilotti (solaria.anzilotti@unifi.it), https://gonewton.it

5.6. LCA application on semi-extensive agrosilvopastoral systems (English)

The OG NEWTON: The Life Cycle Assessment (LCA) of semi-extensive Maremma beef cattle breeding highlighted crucial recommendations for mitigating environmental impact. Diversifying forage, including herbaceous and shrubby resources, and reducing dependence on cereals, is essential to promote growth and reduce animal farm residence. The presence of trees in pasture not only reduces animal heat stress but also significantly contributes to carbon sequestration, offsetting greenhouse gas emissions, especially enteric methane. This improves not only animal welfare but also offers economic and environmental benefits. However, careful livestock load management is crucial to avoid overloading the system. In summary, implementing silvopastoral practices can result in more sustainable and resilient production, with positive impacts on both the environment and the economy. (https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/network-lagroselvicoltura-toscana), contact: solaria.anzilotti@unifi.it

Aplicação da análise do Ciclo de Vida em sistemas agrossilvipastoris semiextensivos (Portuguese)

O GO NEWTON: A análise do Ciclo de Vida da criação semiextensiva de gado bovino Maremma destacou recomendações cruciais para a mitigação do impacto ambiental. A diversificação da forragem, incluindo recursos herbáceos e arbustivos, reduzindo a dependência de cereais, é essencial para promover o crescimento e aumentar a permanência dos animais no exterior. A presença de árvores na área de pastagem não reduz apenas o stresse térmico nos animais, mas também contribui significativamente para a sequestro de carbono, compensando as emissões de gases de efeito estufa, especialmente o metano entérico. Melhorando não apenas o bem-estar animal, mas também oferecendo benefícios económicos e ambientais. No entanto, é crucial gerir cuidadosamente a carga de gado para evitar sobrecarregar o sistema. Em resumo, a implementação de práticas silvopastoril pode resultar em uma produção mais sustentável e resiliente, com impactos positivos tanto para o ambiente quanto para a economia. (https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/network-lagroselvicoltura-toscana), contactar: solaria.anzilotti@unifi.it

5.7. Evaluation of the impact of grazing on the components of the agroecosystem (English)

The OG NEWTON: The main recommendations of this study on silvopastoral management in Italy include the need for careful management of grazing livestock, adapted to the specific characteristics of each forest area. Balanced integration between agropastoral and silvicultural needs is also recommended, aiming to promote sustainable forest regeneration. The objectives of silvopastoral management should be clearly defined, considering the vegetative phase of tree population and soil conservation. Results indicate that a livestock load of approximately 0.30 LU is compatible with tree vegetation development and soil conservation, but this value should be assessed in conjunction with forest management objectives. Overall, the research highlights the feasibility of coexistence between sustainable forest management and grazing, provided there is integrated planning that considers the needs of both activities. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/network-lagroselvicoltura-toscana, contact: solaria.anzilotti@unifi.it

Avaliação do impacto da pastagem nos ecossistemas agrícolas (Potuguese)

O GO NEWTON: As principais recomendações deste estudo sobre gestão silvopastoril em Itália incluem a necessidade de uma gestão cuidadosa da carga animal de pastoreio, adaptada às características específicas de cada área florestal. Recomenda-se também uma integração equilibrada entre as necessidades agropastoris e silvícolas, visando promover a regeneração florestal sustentável. Os objetivos da gestão silvopastoril devem ser claramente definidos, levando em consideração a fase vegetativa do povoamento arbóreo e a conservação do solo. Os resultados indicam que uma carga animal de aproximadamente 0,30 LU é compatível com o desenvolvimento da vegetação arbórea e a conservação do solo, mas este valor deve ser avaliado em conjunto com os objetivos de gestão florestal. Em geral, a pesquisa destaca a viabilidade da coexistência entre a gestão florestal sustentável e o pastoreio, desde que haja um planeamento integrado que leve em conta as necessidades de ambas as atividades. https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/network-lagroselvicoltura-toscana, contactar: solaria.anzilotti@unifi.it

5.8. A feasible step-by-step plan with practical guidelines and concrete designs to enable the application of agroforestry on farms (English)

Although agroforestry has a long tradition in the Netherlands, many practices have disappeared due to land consolidation and changes in agricultural practices. Experiment Agroforestry Noord-Holland has assessed current prerequisites for agroforestry including (i) inventory of existing opportunities, combining scientific and practical knowledge, (ii) developing a practical step-by-step plan for implementing agroforestry, and (iii) applying the plan to three test cases, which will serve as examples for other entrepreneurs. The design process of a step-by-step plan includes: (i) assess the current state of the farm and determine what should be retained or improved, (ii) define goals and ambitions, considering biodiversity, risk management, and product diversification, (iii) analyze the local environment, considering soil type, groundwater level, historical land use, nature goals, and land use regulations, (iv) design the agroforestry system, considering species selection, planting distances, and interactions between trees and crops, and (v) develop a revenue model by defining the target audience, customers, strategic partners, and sources of financing. Customization of the plan depends on e.g. farm type, size, landscape, and an entrepreneur's interests and skills. Experiment Agroforestry Noord-Holland: sijas.akkerman@mnh.nl, https://www.mnh.nl/project/voedselbossen-en-agroforestry/

Askel askeleelta agrometsätalouden toteuttamiseen maatiloilla ohjaava suunnitelma käytännön ohjeineen ja malleineen (Finnish)

Vaikka agrometsätaloudella on Alankomaissa pitkät perinteet, monet käytännöt ovat kadonneet tilusjärjestelyjen ja maatalouskäytäntöjen muutosten vuoksi. Experiment Agroforestry Noord-Holland on arvioinut agrometsätalouden nykyisiä edellytyksiä ml. (i) olemassa olevien mahdollisuuksien kartoitus yhdistäen tieteellistä ja käytännön tietoa, (ii) askel askeleelta agrometsätalouden toteuttamiseen ohjaava suunnitelma kehittäminen ja (iii) suunnitelman soveltaminen kolmeen testitapaukseen, jotka toimivat esimerkkeinä muille yrittäjille. Askel askeleelta ohjaavan suunnitelman suunnitteluprosessi sisältää: i) tilan nykytilan arviointi ja säilytettävien tai parannettavien asioiden määritys, ii) tavoitteiden ja päämäärien määrittely ottaen huomioon luonnon monimuotoisuus, riskienhallinta ja tuotteiden monipuolistaminen, iii) paikallisen ympäristön analysointi ottaen huomioon maaperätyyppi, pohjaveden taso, historiallinen maankäyttö, luontotavoitteet ja maankäyttömääräykset (iv) agrometsätalousjärjestelmän suunnittelu ottaen huomioon lajien valinta, istutusetäisyydet sekä puiden ja viljelykasvien väliset vuorovaikutukset ja (v) ansaintamallin kehittäminen määrittelemällä kohdeyleisö, asiakkaat, strategiset kumppanit ja rahoituslähteet. Suunnitelman mukauttaminen riippuu mm. tilatyypistä, koosta, maisemasta sekä yrittäjän kiinnostuksen kohteista ja taidoista. Experiment Agroforestry Noord-Holland: sijas.akkerman@mnh.nl, https://www.mnh.nl/project/voedselbossen-en-agroforestry/

5.9. New management practices in rainfed olive groves (English)

The GO Olival: In the Southern European region, including Portugal, climate change is severely impacting olive production. To mitigate these effects, new management practices have been proposed. Seven objectives have been outlined, including the assessment of different soil compositions, biological residues, bio-stimulants, genetic varieties of olive trees, and chemicals for inducing drought resistance. Results indicate that using leguminous plants as soil cover protects against erosion, increases organic matter, boosts nitrogen deposition, and, since they have a short cycle, competition for water doesn't occur during the driest period. Early spring herbicide use has also proven to be one of the most effective practices, in reducing water competition. Additionally, the use of mycorrhizae fungi has been shown to increase plant growth and resilience to drought, while abscisic acid improves drought tolerance and olive tree recovery capacity. Implementing these practices is recommended to enhance production system performance, maintain, or improve soil quality, and reduce olive tree susceptibility to pests and diseases, crucial in the face of climate change. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/novas-pr%C3%A1ticas-em-olivais-de-sequeiro-estrat%C3%A9gias.html, contact: appitad@capmail.com.pt

Novas práticas de gestão em olivais de sequeiro (Portuguese)

O GO Olival: Na região do Sul da Europa, incluindo Portugal, as mudanças climáticas estão a prejudicar severamente a produção de azeitona. Para mitigar esses efeitos, foram propostas novas práticas de gestão. Sete objetivos foram delineados, incluindo a avaliação de diferentes composições de solo, resíduos biológicos, bio estimulantes, variedades genéticas de oliveiras e substâncias químicas para indução de resistência à seca. Os resultados indicam que o uso de plantas leguminosas como cobertura do solo permite a proteção do solo contra a erosão, o aumento da matéria orgânica, o aumento da deposição de azoto e, ao mesmo tempo, uma vez que tem um ciclo curto, a competição pela água não ocorre no período mais seco. O uso de herbicidas no início da primavera demonstrou também ser uma das práticas mais eficazes, reduzindo a competição por água. Além disso, a utilização de fungos micorrízicos mostrou aumentar o crescimento das plantas e a sua resiliência à seca, enquanto o ácido abscísico demonstrou melhorar a tolerância à seca e a capacidade de recuperação das oliveiras. Recomenda-se a implementação dessas práticas para aumentar o desempenho dos sistemas de produção, manter ou melhorar a qualidade do solo e diminuir a suscetibilidade das oliveiras a pragas e doenças, crucial face às alterações climáticas. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/novas-pr%C3%A1ticas-em-olivais-de-sequeiro-estrat%C3%A9gias.html, contactar: appitad@capmail.com.pt