B4EST

Adaptive BREEDING for productive, sustainable and resilient FORESTs under climate change

Deliverable D6.5

Report on knowledge transfer activities

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1 Summary

This deliverable D6.5 reports knowledge transfer activities developed within the B4EST project. This includes activities and events addressing different stakeholders through different formats: guidelines, information briefs for policy makers, short-videos, specific events or specific sessions at conference. Dissemination of the project results and communication about the project has grown continuously during the project. The Covid-19 pandemic from March 2020 has brought huge challenges and in-person opportunities for stakeholder engagement have been extremely limited. For this reason, the project's exchanges with stakeholders have been rethought with increasing success of virtual formats. Products and materials dedicated to stakeholders as well as policy briefs are available on B4EST website which will remain active after the end of the project.

2 Introduction

This deliverable is reporting knowledge transfer activities and events addressing different stakeholders outside the scientific community. The target public includes European tree breeders active in developing improved genetic material for the future (FRM), forest nurseries and forest managers responsible of stand management and forest planning, forest industry for which quantity and quality of wood resources produced with improved FRM is a major subject, and policy makers at regional, national or even European levels.

Through the participation of a large variety of actors, B4EST covers the full TRL spectrum from producing fundamental knowledge to delivering tested practical solutions to end-users and informing policy/decision-makers.

WP	TRL	Explanation
WP1	2-7	Species/FRM sensitivity to key biotic and abiotic factors. Integrated risk maps
WP2	3-5	New knowledge on productivity/adaptation trade-offs. Optimal genetic diversity selected for high performance and resilience. Patterns of adaptation capacity at stand and landscape levels.
WP3	5-7	Genotyping tool for operational breeding. Genome-assisted breeding toolbox.
WP4	5-9	Multi-factor predictive models of FRM performance. Deployment guidelines considering risks and uncertainty. User-friendly decision support tools
WP5	6-7	Cost/benefit analysis. Recommendations on best adaptive strategies for biomass production, ecosystem resilience and other societal demands. Integrative prediction models based on forest practices, risks and opportunities, and decision-support for forest management and planning

D6.5 is linked to Task 6.4 - Knowledge transfer for end-users and policy makers to facilitate uptake which had as specific objectives to:

- Foster high level engagement by relevant stakeholders and end users, and open exchange with them through survey, open seminars, specific regional events
- Raise awareness of and promote the project and its activities on regional, national and European levels, maintaining project visibility throughout its duration

- Communicate widely the results and applications of the project, encouraging and facilitating their uptake and implementation by target audiences in order to optimise their use and exploitation
- Provide support to decision-makers in developing/implementing improved forest regulatory policies.

In the following sections, a link is given to B4EST website specific pages where the different productions are available.

3 Results/activities

3.1 Knowledge transfer material through social media, the public project website and annual newsletters

The **public project website** (www.b4est.eu) includes all public results and information produced by the project, a blog of timely news posts (38 posts during the projects) and advertises all public events dedicated to all or more specific publics.

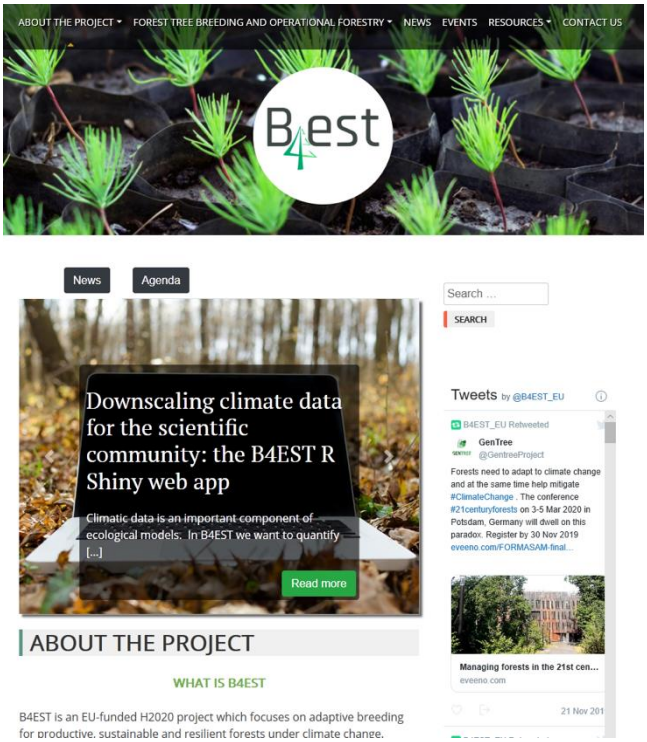


Figure 1. B4EST website

Annual newsletters based on highlights from the blog posts has been distributed to large list of stakeholders in June 2019 (M14), September 2020 (M29), June 2021 (M38) and September 2022 (M53). **Social media**, including a lively Twitter account (@b4est_eu) and ResearchGate entry were continuously used by B4EST partners and stakeholder's audience to post information on B4EST events and on other activities in link with B4EST interest on tree breeding.

3.2 Knowledge transfer material for forestry sector stakeholders and non-specialist public

Products and materials dedicated to stakeholders, the public and policymakers were developed in the final phase of the project, as results and scenario analysis advanced in other work packages. This included:

- three non-specialist public leaflets based on the materials synthesised in the EU-level policy brief (i) What is forest tree breeding? (ii) Where and how is tree breeding used? (iii) How does forest tree breeding support the EU green deal, forest strategy and biodiversity policies?
- A series of four short videos also explained these issues, and were made available on the B4EST YouTube channel. These videos reached between 12 to 35 views one month after their publication.
- A graphical manual for forest managers and tree breeders popularizes the information from D4.9 that is of practical interest, and has been produced by IEFC. It provides a description and a link toward the tools produced within B4EST and description sheets of the deployment recommendations for the 8 case study tree species. A working version is available on the following link and final access through B4EST website is expected for January 2023.

- An executive summary of the online survey carried out under WP5 with the objective to get a comprehensive picture of desired benefits of improved FRM across Europe. The survey yielded 565 responses. The executive summary was translated into six languages: EN, DE, ES, FR, NO and SE.

As recommended following the EC review n°2 held on 26/08/2021, change of status of deliverables from Confidential to PUBLIC made it possible to improve early awareness and dissemination of results which present specific interest to a large range of stakeholders in Europe: forest tree breeders and seed managers (D3.5, D4.7), forest owners and policy makers (D4.5, D4.6, D4.9), the entire forest tree sector (D5.3, D5.4, D5.5, D5.6, D5.7). Once validated by EC reviewers and PO, public deliverables are available on B4EST website specific page.

3.3 Knowledge transfer and training activities for forestry sector stakeholders

The development of four major new decision tools has been organised as a deliberative and these tools have been designed not only to help practitioners to match FRM with current and future environmental and economic conditions, but also with specific management objectives and risk perceptions at regional and stand scales:

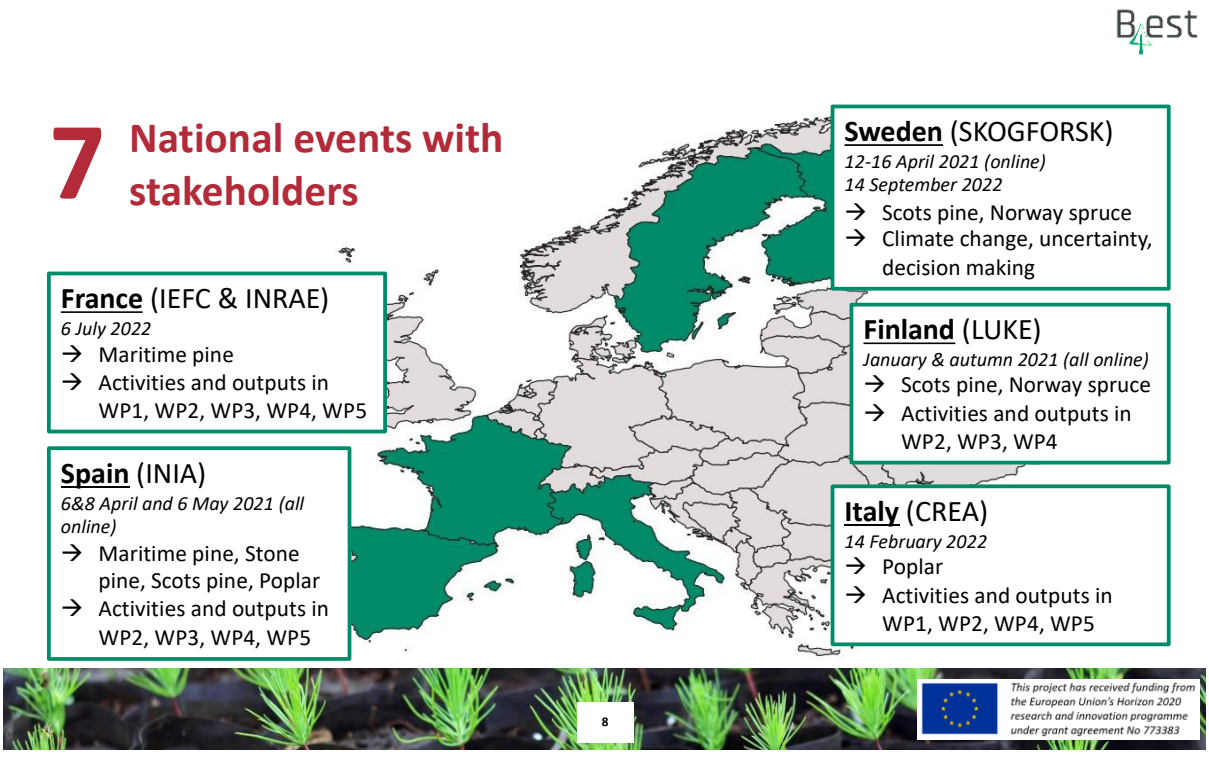
- Climate matching tool. This web-based decision-support tool that can be used by practitioners to identify the geographic areas for which (1) the current climate matches the projected future climate at a location of interest, (2) the projected future climate matches the current climate at a location of interest. Available on B4EST web-page, this tool has been presented by Duncan Ray (Forest Research, UK) during a specific session of B4EST international conference in Lisbon (June 2022- its presentation).

- Climate downscaling tool. This is a geo-web service on which scale-free climatic variables and indexes of current and future climates can be downloaded on a 1-km grid. Available on B4EST web-

page, this tool has been presented by Maurizio Marchi (CNR, Italy) during a specific session of B4EST international conference in Lisbon (June 2022- its presentation).

- Planter's guide. The B4EST project also supported the development of a web-based decision-support tool called the Planter's Guide which provides recommendations for a given regeneration site of the best available Scots pine and Norway spruce seedlings from seed orchards in Sweden and Finland. These recommendations correspond to URF predictions for growth and survival based on tailored climate variables updated in WP4. Mats Berlin (Skogforsk, Sweden) presented the tool in 2019 in a dedicated webinar still available on B4EST website. Then, he presented the tool's new developments in session C of the B4EST international conference in Lisbon (June 2022 – its presentation) and at different stakeholders events organized in Nordic countries.

- Luberon2 simulation tool. This new simulation tool developed under the frame of B4EST is combining silviculture and genetic composition of FRM scenarios and test innovative uses of improved FRM. Luberon2 now runs either for *Pseudotsuga menziezii* or *Cedrus atlantica* and drought-like disturbance regime was added to the model. The Luberon2 system facilitates novel methods to actively manage stand development under natural regeneration. Using a graphical interactive environment or a script mode, Luberon2 can be used with various levels of expertise for communication, teaching, training, research or decision-making purposes. Specific efforts have been devoted to preparation of a User manual and installation tutorial.



Over the duration of the project, **seven national events** for stakeholders were held, five of which took place within the final reporting period in France, Sweden, Finland, Italy and Spain. These events were both online and in-person, and reached a diverse audience of around 400 people in total (including forest companies, policymakers such as national, regional and local authorities, and the scientific community). The events included local and focused meetings on a particular topic (eg a

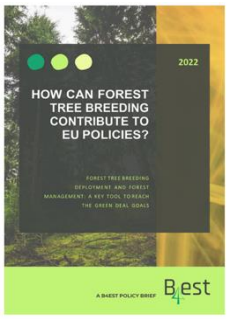
French symposium dedicated to the latest findings on Maritime pine), as well as contributions to national conferences dealing with political issues (eg a Spanish National breeding programme meeting organised by the Ministry of the Environment, or the Swedish Central, Seed and Plant Council meeting). B4EST partners took also opportunities of attendance to national stakeholders events to disseminate last relevant results from B4EST project.

IEFC's Let's talk about Planted Forests webinar on tree breeding will also take place on 13 January 2023 at 1pm CET. During this webinar B4EST project partners (Mats Berlin-Skogforsk, Egbert Beuker-LUKE, Catherine Bastien- INRAE) will comment on the main outcomes of the project that finished in 2022. This webinar will be an opportunity to discuss how tree breeding's new tools can help to better adapt forest plantations to global change, what are the deployment recommendations and tools developed during the project, and the legal issues and policy needs identified.

3.4 Policy engagement

Different activities developed in WP3, WP4 and WP5 provided guidelines on best forest management practices which need to be accompanied by policy recommendations that provide a strong framework for the development of the forestry sector in Europe.

Two policy briefs have been produced during the project:



- A first one, dedicated to the EU-level looks at how forest tree breeding can contribute to EU policies, and how forest tree breeding deployment and forest management can be a key tool for reaching the EU Green Deal goals. The policy brief explores what challenges lie ahead for the future, and makes recommendations as to what policy changes are needed.
https://b4est.eu/wp-content/uploads/2022/09/B4EST-Policy-Brief-Final_2022.pdf

- A second one, dedicated to Nordic region has been jointly produced by partners from Sweden (SKOGFORSK), Finland (LUKE) and Norway (NIBIO). This Nordic policy brief focuses on specific challenges for the Nordic region, and provides recommendations for FRM management and transnational cooperation.
https://b4est.eu/wp-content/uploads/2022/09/NORDIC-POLICY-BRIEF_web.pdf

Two round-tables that invited stakeholders from different European countries were organized in linked with session C (Deployment of Forest Reproductive Material) and session D (Science policy interface for mitigation, adaptation and risk management in forestry) of the B4EST International Conference in Lisbon (June 2022). Discussions were reported in D6.6.

3.5 Final foresight document

The initial, two-and-a-half-day participatory writeshop scheduled to prepare a foresight document was difficult to organize in a context where Covid-19 situation still complicated travels across countries. Production of this foresight document making value of B4EST main results produced was prepared through specific webinars and exchanges between co-authors of an article published in October 2022 in Frontiers in Forests and Global Change (https://doi.org/10.3389/ffgc.2022.1005761). It took also advantage of discussion after presentation of main messages of this foresight during at the international Conference in Lisbon (Catherine Bastien, coordinator, presentation).

4 Conclusions

This document sets out the list of knowledge transfer activities developed within the B4EST project. At the end of the project (M53), all planned activities targeting different stakeholder groups have been developed despite difficulties and delays explained by the Covid-19 crisis. If this crisis has seriously limited exchanges in specific events or conferences, it finally helped the organization of regular webinars with increasing numbers of attendees. Different documents (leaflets, policy briefs, short-videos) are available on B4EST website. Other leaflets (i.e. Layman reports for the four case studies in WP5) will be prepared after the end of the project and communication about B4EST project will continue.

5 Partners involved in the work

EFI, IEFC, INRAE, FR, SKOG, LUKE, NIBIO, INIA-CSIC, LUKE, FINS, ALTRI, CREA, CIRAD