



Annual report, Centre of Excellence Trees For Me, 2025

Contents

Contents	2	Work package 3	
This is Trees For Me	4	– Material and energy.....	10
Research	4	Work package 4	
Education	4	– Societal transitions	11
Collaboration	4	Work package 5	
Partner organisations	5	– Environmental impacts.....	12
Management and governance	5	Education and Collaboration	14
The first years in short (2022–2025) ..	6	Activities for PhD students and post	
Research	7	docs	14
Work package 1		Education for practitioners and	
– Tree breeding	8	in academia	14
Work package 2		Key performance indicators	16
– Silviculture	9		



**This is
Trees For Me**



This is Trees For Me

Trees For Me (**T**rees, sustainable **FOR**est, **M**aterial and **E**nergy) is a Centre of Excellence focused on fast-growing broadleaf trees for sustainable forestry, materials and energy in Sweden.

The Centre is a platform where academia, government and industry/society come together to develop science-based, innovative solutions by combining expertise along the whole forest-based value chain. Future competence is to be built in a new forest biomass supply system for conversion to high-value material and energy products.

Research

Trees For Me coordinates an interdisciplinary research programme with the aim to advance the science beyond the state-of-the-art in the full value chain from seed to sustainable fuels and high value-added products from fast-growing broadleaf trees. The research is conducted within the work packages of tree breeding, silviculture, material and energy, societal transitions and environmental impacts.

Tree breeding



Silviculture



Material and energy



Societal transitions



Environmental impacts



Education

There are 12 PhD students and two post-docs that are financed by Trees For Me and an additional eight PhD students that are working with fast growing broadleaves but financed by other sources. The first thesis defence will take place in the autumn of 2026 and will be followed by many more during the winter of 2026/2027.

Trees For Me's research results are already now extensively used in teaching and most of Trees For Me's researchers and PhD students are course leaders and involved in teaching at the bachelor's and master's level.

Trees For Me also brings together research expertise with relevant societal actors, government organisations and industrial partners

who will implement the research results in practice. We conduct educational activities, seminars and excursions to increase the knowledge of sustainable biomass production and material use from fast-growing broadleaf trees.

Collaboration

Trees For Me is financed by the Swedish Energy Agency and almost 50 societal actors, ranging from academia and companies to interest organisations.

The Centre is coordinated from the Swedish University of Agricultural Sciences (SLU) in Alnarp, Skåne.

1/3: partner organisations from the forest and energy sector

1/3: the Swedish Energy Agency

1/3: academic actors: Swedish University of Agricultural Sciences (SLU), Luleå University of Technology (LTU), Skogforsk, Umeå University (UmU), Uppsala University (UU)

Partner organisations

Private forest owner associations

- Mellanskog
- Norra Skog
- Södra
- Skogstekniska klustret
- Spillkråkan
- Svenska Jägareförbundet

Forest companies/forest owners

- Holmen
- Kopparfors Skogar
- Poppelbolaget
- SCA
- Skogssällskapet
- Stiftelsen Skånska Landskap
- Stora Enso
- Sveaskog
- Svenska Kyrkan
- Sydved

Energy companies

- Cortus Energy
- Harads Arctic Heat
- Skellefteå Kraft
- Uddevalla Energi

Public administration

- Nordic Forest Research (SNS)
- Nordic Joint Committee for Agricultural and Food Research (NKJ)
- Norrbottens skogsstrategi
- Skogsstyrelsen
- Skånsk skogsstrategi (Länsstyrelsen Skåne and Region Skåne)
- Smålands skogsstrategi
- Västerbottens skogsstrategi

Other companies

- Arevo
- Björkemar Construction & Consulting BCC
- Bracke Forest
- Organox
- Persson f.N.B
- Ramlösa plantskola
- Skogspodden
- SweTree Technologies
- Sydplantor
- TreeToTextile

Non-profits and other organisations

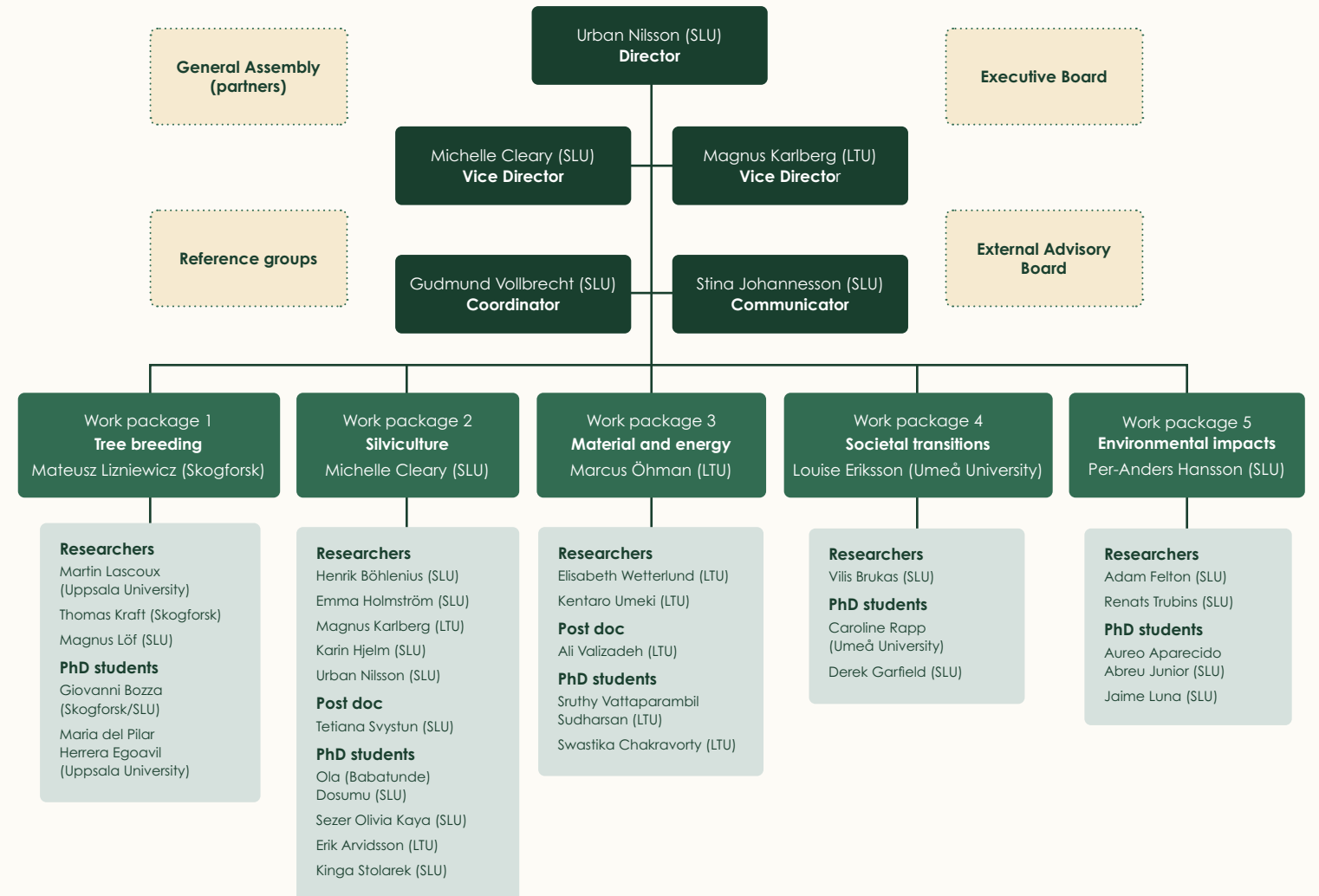
- Biosfärområde Vindelälven-Juhtátahka
- Lantbrukarnas riksförbund (LRF)
- Naturskyddsföreningen Blekinge
- Naturskyddsföreningen Skåne

See full list of partners: www.treesforme.se/en/collaboration

Management and governance

Trees For Me is managed by several steering groups consulting on academic and managerial issues.

All co-financing partners are represented in a reference group.



The first years in short

(2022–2025)

Research

43 scientific publications and conference contributions

10 licentiate and half-time seminars completed.

53 approved research and communication funding applications by December 2025, totalling more than 49 million SEK



Education

Nine MSc and two BSc theses directly related to Trees For Me.



Outreach

105 news articles and radio/TV features in external media.

44 webinars targeting partners, forest owners, advisors, researchers, and the general public.

34 own popular science articles.

2925 registrations for webinars.

358 meetings and events with internal and external stakeholders.

47 other outreach activities, e.g. participation in external excursions, information and networking events, outreach to politicians, etc.

338 newsletter subscriptions, with an average open rate of 54 % across 12 newsletters.

526 followers on LinkedIn (by 4 February 2026) and engagement rate of 9,9 % for 2025 (an engagement rate above 5% is considered excellent).



Research





Work package 1 – Tree breeding

PhD students

Giovanni Bozza, María Del Pilar Herrera Egoavil

Researchers and project leaders

Mateusz Liziniewicz, Martin Lascoux

The research conducted by Trees For Me spans 17 research projects and focuses on tree breeding, silviculture, material and energy, societal transitions and environmental impacts. Below the leaders of the research work packages present the latest updates from the respective projects.

Researcher in tree breeding and work package leader Mateusz Liziniewicz shares the latest updates from the research projects.

Work package 1 strengthens the biological foundation for increasing the use of fast-growing broadleaves in Swedish forestry, with a primary focus on silver birch. The work integrates operational breeding, genomic selection, flowering research and seed orchard development.

During 2024–2025, substantial progress has been made in expanding breeding infrastructure. Four new progeny trials were established in northern Sweden to test 65 full-sib crosses from established breeding populations. Approximately 14,000 seedlings were planted, representing the first trials of this type in northern Sweden since 1995. These trials form a key resource for identifying superior genotypes for future breeding cycles and seed orchard establishment.

In 2025, operational breeding focused on maintaining recently established trials and producing new breeding material. Protection against browsing and vole damage has been important for maintaining seedling vitality. Around 50 new full-sib family crosses were completed, bringing the total number of new families available for future tests to approximately 150. Studies of phenological traits in F1 material have also begun in three trials in southern Sweden in order to assess adaptation to Swedish climate conditions. Collaboration with European breeding organisations has strengthened during the year, expanding the birch breeding network across Europe.

Genomic selection activities have progressed substantially. Plant material from four trials was collected for DNA extraction and genotyping, resulting in approximately 3,000 sampled individuals. The first genomic dataset was delivered in December 2025 and will be used to develop the first genomic prediction models for birch breeding in Sweden during 2026. Analyses of the genomic structure

of Swedish birch populations revealed two main genetic groups, one in the north and one in the south, meeting in a contact zone around central Sweden. Although overall genetic differences are small, clear signals of local adaptation suggest that climate and environmental conditions contribute to maintaining population differentiation.

Research on accelerating breeding cycles has also progressed. Experiments initiated in 2024 to induce early flowering using continuous light were evaluated in 2025. The results showed that continuous light strongly stimulates flowering, particularly female flower formation, and induced trees produced viable seeds. These findings confirm that light induction is a promising method to accelerate breeding cycles in silver birch.

Finally, grafting for several seed orchards has continued and the first grafted plants have been delivered and planted. Seven new seed orchards are planned for establishment in the coming years, partly driven by increasing awareness of seed shortages among forest owners and forestry companies.





Work package 2 – Silviculture

PhD students

Kinga Stolarek, Erik Arvidsson,
Ola Dosumu, Sezer Olivia Kaya.
Affiliated: Alfred Deutgen, Andis Zvirgzdins,
Iida Puurula, Joel Jensen, Luca Muraro,
Michalina Grabowska

Post doctoral researcher

Tetiana Svystun

Researchers and project leaders

Karin Hjelm, Magnus Karlberg, Emma Holmström,
Henrik Böhlenius, Michelle Cleary, Urban Nilsson.
Affiliated: Felicia Dahlgren Lidman

The work package leader and Associate Professor in forest pathology, Michelle Cleary, shares updates from the silvicultural research.

Work package 2 develops the knowledge and tools required to successfully establish, manage and protect stands of fast-growing broadleaves in Swedish forestry. The work integrates nursery production, regeneration experiments, stand management studies, forest technology development and forest health research in order to address both biological and operational challenges associated with increasing the share of broadleaves.

Within the PhD project “Seedlings and Regeneration Procedures for Future Birch Forests”, research addresses the entire regeneration chain from seed quality and nursery production to field establishment of silver birch. Analyses of fungal communities associated with birch seeds revealed the presence of potential pathogens that may reduce germination and cause damping-off. This represents the first systematic assessment of fungal communities in Swedish birch seed lots and provides important knowledge for improving seed handling and nursery hygiene practices. The project also evaluates nursery overwintering practices for containerized birch seedlings. While conifer species such as Norway spruce and Scots pine have well-established storage protocols, birch may require modified approaches. Experiments have examined short-day treatments to induce dormancy as well as different freezer storage durations and their effects on seedling vitality. In addition, the feasibility of producing birch seedlings using “just-in-time” production is being explored. In this system winter storage is skipped and seedlings are produced shortly before planting. Because birch grows rapidly this approach may be operationally attractive, although seedlings may be more sensitive to handling and transport conditions. Finally, large-scale field experiments evaluate the performance of containerized birch seedlings across Swedish climatic regions. These experiments investigate the effects of container size, planting date, site preparation method, fertilisation and planting timing relative

to clear-cut age. Data from three growing seasons (2023–2025) have been collected and preliminary analyses are ongoing. Together, these studies will generate research-based recommendations that improve regeneration success and provide operational guidance for nursery production and planting of birch.

A parallel PhD project focuses on stand management and the development of silvicultural guidelines for planted birch in both monocultures and mixed stands. Earlier work analysed how thinning strategies influence productivity and economic performance in mixed stands. Results published in the Scandinavian Journal of Forest Research showed that spruce-dominated mixtures can achieve similar growth and improved economic outcomes compared with spruce monocultures, although maintaining a high proportion of birch may involve trade-offs between productivity and profitability. Further research examines regeneration dynamics and species interactions in mixed stands. Experiments on former agricultural land compared simultaneous planting of birch and spruce with staggered planting one year apart. Preliminary results indicate that birch growth is only marginally affected when planted after spruce, whereas spruce growth is negatively affected when planted after birch. Additional experiments investigate thinning intensity and stand development in planted birch stands. Four new thinning trials were established in southern Sweden, and data collected after three growing seasons in 2025 are currently being analysed. Parallel thinning experiments in Latvia have also been measured and will contribute to improved growth and yield models as well as development of height functions for planted birch stands.

Work package 2 also contributes to technological innovation through research on autonomous regeneration systems for broadleaf forests. In collaboration with Bracke Forest and Luleå University of Technology, a path-planning tool named TerraTrail has been developed to optimise driving routes for mechanised planting systems. The tool uses advanced optimi-

zation algorithms to minimise driving distance while accounting for terrain constraints and no-go areas. Validation using operational data from PlantMax operations demonstrated that improved path planning can significantly reduce machine travel distance and increase planting efficiency. The system has been tested on the AORO autonomous research platform, and improvements to perception systems, navigation and mission planning were implemented during 2025.

Forest health research addresses potential risks from pests and pathogens affecting planted birch. Experiments investigating root rot suggest that infection of birch stumps by *Heterobasidion annosum* occurs relatively rarely, possibly due to competition from other fungi such as *Ophiostoma quercus*, whose interactive effects have been studied in laboratory experiments. Field studies also examined insect damage caused by pine weevils, particularly *Hylobius abietis*. Mechanical protection of seedlings significantly reduced mortality compared with untreated seedlings, though results from this and follow-up trials established in 2024-2025 suggest overall low incidence of damage in newly planted birch. Nevertheless, browsing is a major constraint for birch.



Work package 3 – Material and energy

PhD students

Swastika Chakravorty,
Sruthy Vattaparambil Sudharsan

Post doctoral researcher

Ali Valizadeh

Researchers and project leaders

Marcus Öhman, Elisabeth Wetterlund,
Kentaro Umeki

Marcus Öhman, work package leader and professor in energy engineering, presents the latest updates related to material and energy research.

Work package 3 investigates how fast-growing broadleaf species can contribute to sustainable and economically viable forest-based value chains, covering forest management, biomass supply systems and thermochemical conversion technologies.

A central focus has been evaluating the economic performance of birch-based production systems. Using the Heureka forest simulation tool, different management strategies for birch monocultures and birch-spruce mixtures were compared with conventional conifer-based forestry. The analyses examined the effects of early energy thinning, birch timber production at final felling and time-sensitive patch thinning strategies.

The results indicate that energy biomass harvesting during early thinnings can be economically viable, particularly in birch-spruce group mixtures on productive sites. The development of a market for birch timber can offset early thinning costs and improve rotation-scale profitability. Estate-level spatial analyses further explored the implications of replacing conifers with site-adapted birch patches. The results suggest that increasing birch share mainly alters assortment composition and increases landscape heterogeneity without necessarily reducing long-term land expectation value, although operational logistics remain an important consideration.

Research on thermochemical conversion examines how forest management and biomass composition influence fuel properties and conversion processes. Earlier work analysed biomass from a second-rotation poplar experimental site subjected to different thinning treatments. Stem wood, bark and branches were analysed for ash-forming elements and organic macromolecules such as cellulose, hemicellulose and lignin. The results showed that poplar biomass exhibits ash characteristics comparable to conven-

tional forest fuels from conifers and birch, indicating good suitability for thermochemical conversion.

A complete biomass value chain was also evaluated for a high-yielding poplar stand, including harvesting, transport, fuel preparation and combustion in a district heating plant. The biomass showed fuel properties comparable to conifer and birch fuels and superior to typical *Salix* assortments. In addition, a combustion trial using a 20% admixture of birch roundwood in a full-scale circulating fluidised bed boiler demonstrated stable operation without significant differences in efficiency or emissions compared with standard fuel mixtures.

Recent work has expanded to include detailed characterisation of biomass structure and thermo-physical properties. Three-dimensional imaging has been used to analyse cell wall structures and vascular vessels, while thermal characterization experiments measured specific heat capacity and thermal conductivity of biomass particles. These parameters are essential for modelling heat transfer during thermochemical conversion.

A predictive kinetic model has also been developed to simulate thermochemical reactions based on the molecular composition of biomass components. This model provides a tool for designing and optimising conversion processes when using different types of biomass, including fast-growing broadleaf species. Additional research investigates ash recirculation effects and the potential role of biochar and bioenergy with carbon capture and storage in future bioenergy systems.





Work package 4 – Societal transitions

PhD students

Caroline Rapp, Derek Garfield

Researchers and project leaders

Louise Eriksson, Vilis Brukas

Louise Eriksson, work package leader and Associate Professor in environmental psychology shares the latest updates from the research on societal transitions.

Work package 4 examines societal perspectives on increasing the share of fast-growing broadleaves in Swedish forestry. The research focuses on systemic drivers of change, forest owner decision-making and stakeholder acceptance.

The work builds on system transition theory and integrates psychological and geographical perspectives to understand both structural change and individual behaviour. Two main projects form the core of the work package: "System innovations" and "Forest owners and stakeholders".

The System innovations project analyses how value creation and innovation around fast-growing broadleaves are evolving. Earlier analyses identified six different niche configurations ranging from small rural businesses producing birch-based beverages to large-scale industrial production of hardwood textile pulp. These examples illustrate the diversity of innovation pathways emerging around broadleaf resources.

During 2025, one scientific article on niche configurations was published and additional manuscripts were submitted. Data collection for a further study exploring stakeholder perspectives on broadleaf expansion in southern Sweden has been completed. Survey results indicate broad agreement among stakeholders that expansion of fast-growing broadleaves should continue, although opinions differ regarding the pace and scale of change. Participatory workshops also highlighted key barriers, including limited coordination between supply and demand actors and insufficient information about existing broadleaf resources.

The Forest owners and stakeholders project focuses

on private forest owners' management decisions. Analyses of a nationwide survey show that both contextual factors (such as site conditions and landscape context) and psychological factors (including beliefs and emotions) influence interest in planting improved birch. Further analyses examined adoption of hybrid aspen and poplar in central and southern Sweden. While overall willingness to adopt these species is relatively low, place-based experiences—such as familiarity with the species or having seen them locally—are associated with stronger adoption intentions. Interviews with forest and non-forest stakeholders are currently being analysed to better understand broader societal acceptance of fast-growing broadleaves.



Work package 5 – Environmental impacts

PhD students

Jaime Luna,
Aureo Aparecido Abreu Junior.
Affiliated: Emil Andersson,
Pierre van Rysselberge

Researchers and project leaders

Adam Felton, Per-Anders Hansson,
Renats Trubins

Per-Anders Hansson, work package leader and Professor at the Department of Energy and Technology, SLU, presents updates from the research projects related to environmental impacts.

Work package 5 evaluates the environmental implications of increasing the use of fast-growing broadleaves by integrating climate systems analysis and biodiversity research.

Climate impacts are assessed using time-dependent life-cycle assessment (LCA), which evaluates temperature responses over time based on greenhouse gas fluxes. The methodology accounts for carbon dynamics in soil and biomass, emissions along the value chain, carbon stored in harvested wood products and substitution effects from replacing fossil-based materials. In addition, land surface albedo effects can be incorporated.

One study assessed the climate effects of using improved birch genotypes with approximately 20% higher productivity compared with non-improved genotypes under a 50-year rotation. The analysis also evaluated the effect of shifting the product portfolio from short-lived products such as bioenergy or paper to longer-lived products such as viscose and sawn-wood. The results show that both improved growth and increased production of long-lived wood products can significantly reduce global warming impacts across different time perspectives.

A second study compared the climate impacts of replacing Norway spruce with birch across sites with different productivity levels. Preliminary results indicate that on low-productivity sites, replacing spruce with improved birch—particularly when used for long-lived wood products—can reduce climate impacts. On highly productive sites, however, spruce remains more favourable from a climate perspective. These results highlight the importance of site-specific management decisions.

Future work will examine how biochar production and bioenergy with carbon capture and storage

from birch biomass could enhance soil carbon retention on agricultural land.

The biodiversity research focuses on organisms closely associated with tree species and forest structures, particularly epiphytic lichens and dead-wood dependent species. Field surveys were conducted in 48 stands of birch, poplar and hybrid aspen across southern Sweden, sampling 960 trees. Birch stands showed the highest lichen species richness, although all tree species hosted species of conservation interest.

An experimental study examining colonisation of dead wood from several broadleaf species has identified more than 3,000 individuals representing approximately 400 taxa. These data are currently being analysed to evaluate conservation and ecological implications.

Additional work includes a systematic review of biodiversity in fast-growing broadleaf stands and field studies of forest ant communities, which indicate that surrounding forest cover and previous land use strongly influence species composition.



Education and Collaboration



Education

Trees For Me provides postgraduate studies, with an interdisciplinary approach, which contributes to scientific and technical solutions for fast-growing broadleaf biomass and bioenergy. The researchers of the centre also conduct teaching on undergraduate and master level, and the centre provides educational activities for practitioners to make sure the knowledge output of the centre is put into practice.

Activities for PhD students and post docs

The centre provides several educational activities related to the PhD studies and career development. Monthly meetings are held with the PhD students, post doc researchers and supervisors discussing topics such as leadership, communication and perspectives of the Swedish forest debate. The partner organisations are sometimes invited to present their organisation and share experiences on how to build a career in the Swedish forest and energy sector.

All PhD students within and associated with the centre have been invited to participate in a mentorship programme, through which the centre has matched the PhDs with senior professionals in the forest and energy industry or academia.

Education for practitioners and in academia

The centre has provided monthly webinars with updated research knowledge on fast-growing broadleaves from researchers and practitioners in the field. The webinars have attracted a broad audience of forest owners, advisors, researchers and other stakeholders and provided an appreciated arena for discussions transcending professional borders.

A collaboration was initiated between the centre and the Swedish Forest Agency resulting in co-arranged webinars and excursions between 2024-2026, and educational activities and excursions have also been arranged in collaboration with other stakeholders e.g. Skogforsk and Arena Skog.

The research results are also included in academic teaching, on bachelor's and master's level, conducted by the researchers affiliated with the centre.

Collaboration

Trees For Me's extensive partner network, which includes almost 50 affiliated organisations from the forest and energy sectors, plays a pivotal role in the centre development. Many of the partner organisations have continued to show a strong interest and been engaged in the centre activities. These collaborations are always carried out with a strong commitment to maintaining academic independence in all research efforts.

An example of a collaboration initiated during 2025 was the collaborative project with Södra intended to investigate how research-based knowledge about fast-growing broadleaf trees could be made available in forest owners' planning tool. The project is made possible due to a grant from the Formas communication call 2024.

Key performance indicators



Key performance indicators

To track the overall progress of the Centre, key activities are continuously monitored using key performance indicators (KPI) focused on publications, activities and achievements, outreach and added funding. This KPI review covers the period from the Centre's start date, 2022-01-01 until 2025-12-31.

Progression of key performance indicators

The progression of scientific journal publications is shown in Fig. 2. During 2025, nine papers were published in journals leading to a total of 25 now being recorded. A similar trend holds for the 18 scientific conference contributions, which were presented and subsequently published in the associated proceedings.

To disseminate results beyond the centre's organisation, a range of outreach activities are conducted. Figure 2 illustrates the development of popular science publications, primarily web articles. During 2025, nine popular science publications was published reaching a total of 34 to date. 11 webinars were further carried out during 2025 thus reaching a total of 42. In particular the webinars co-hosted with the Swedish Forest Agency have attracted a large audience.

In addition to the webinar series, media communication has been an important channel for engaging stakeholders beyond the centre. As shown in Figure 2, these activities have increased steadily with 24 items during 2025, reaching a total of 109, primarily consisting of articles in forestry magazines.

The centre has maintained an active presence on LinkedIn. This year, the engagement rate on the centre's LinkedIn page was 9,9 %, and the amount of followers were doubled to 526. The Swedish webpage had 8906 unique page views during 2025 while the English web page was visited via 5377 unique page views. 59 outreach activities were carried out during 2025 which gives a total, since the centre started, of 331 activities.

Stakeholders in Trees For Me (excluding universities and research institutions) are actively engaged in

a variety of centre activities, including reference group meetings, work package meetings, executive board meetings, workshops, seminars, and excursions. Figure 2 illustrates the progression of stakeholder participation in these activities. During 2025, stakeholders participated in 78 events, bringing the total number of events since the centre's establishment to 240.

To further accelerate the centre's research, enhance the utilisation of results, and strengthen knowledge transfer, additional funding has been actively sought from organisations such as Formas, KSLA, and Åforsk. Figure 2 also shows the development of additional funding secured to support the centre's activities. During 2025, SEK 10 million in associated funding was approved, bringing the total additional funding secured by the centre to almost SEK 50 million.

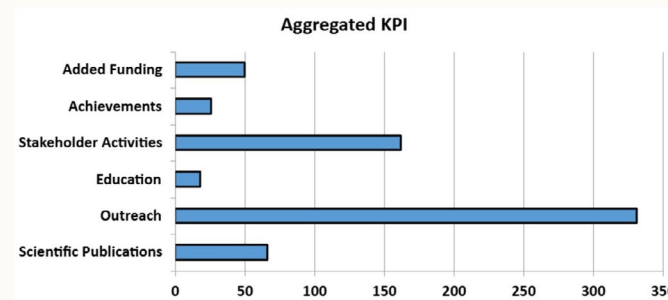


Figure 1. Summary of aggregated KPI into categories

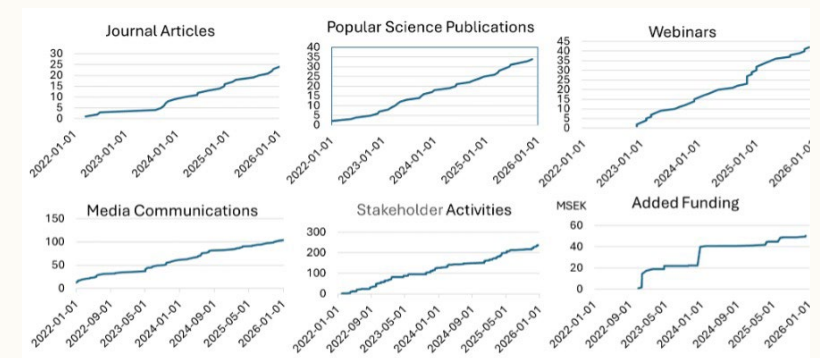


Figure 2. Accumulated progression of key performance indicators per category

