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Grant Proposal

A transnational cooperation for sustainable use and management of non-native trees in urban, peri-urban and forest ecosystems in the Alpine region (ALPTREES)

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Abstract

The expected benefits and potential risks of non-native tree species (NNT) to European geographic regions have polarized the opinions of experts and citizens. Benefits include climate change (CC) mitigation and adaptation, contributions to bioeconomy, urban and peri-urban green infrastructure and mitigation of natural hazards. However, NNT may become invasive and thus may pose risks to native biodiversity, ecosystem functioning or

socio-economy. In critical and vulnerable ecosystems such as the Alpine Space (AS), such risks and benefits must be carefully considered before management decisions are made. Experiences in the management of NNT in urban areas, peri-urban, rural territories and forests are often region- or city-specific and rarely shared. Given the challenges in NNT management with respect to both benefits and risks, an European transnational approach is needed to qualify the role of NNT in future AS ecosystems. The objective is to provide a transnational strategy for a responsible use and sustainable management of NNT in the AS with the help of an integrated Decision Support System. The project fits within the context of national and regional site-derived policy aiming at protecting and enhancing biodiversity to ensure ecological connectivity and cultural resources while maintaining a high level of resilience and ecosystem services across the AS. Implementation activities of the ALPTREES project include

1.   developing a comprehensive database on NNT,
2.   projecting the current and potential distribution of NNT in the AS under CC scenarios
3.   determining their invasive potential and
4.   analyzing the different ecosystem services provided by NNT to assess the tradeoffs between risks and benefits.

ALPTREES will formulate management recommendations for NNT under different climate and economic scenarios based on experience from sample plots combined with model projections, citizen science, and multiple stakeholder meetings. With the help of policy briefs, a handbook of lessons learned, transnational pilot actions for best management practices, and an inter-active online Decision Support System a close stakeholder interaction and -benefit will be ensured Another innovative output of the project is the Open ALPTREES Knowledge Hub, that will support the transnational and interdisciplinary knowledge transfer.

Keywords

climate change, non-native trees, alpine space, stakeholder

Translations of the Abstract

Deutsch (German)

Die erwarteten Vorteile und potentiellen Risiken von nicht-heimischen Baumarten (non-native trees, NNT) für die Regionen im europäischen Raum polarisieren die Meinungen von Experten und Bürgern. Zu den Vorteilen gehören eine mögliche Eindämmung des Klimawandels sowie eine Anpassung an diesen, Beiträge zur Bioökonomie, zur Infrastruktur im städtischen und stadtnahen Raum und zur Minderung von Naturgefahren. NNT können jedoch invasiv werden und somit Risiken für die heimische biologische Vielfalt, die Funktionsfähigkeit von Ökosystemen oder die Sozioökonomie darstellen. In

sensiblen und kritischen Ökosystemen wie dem Alpenraum (Alpine Space, AS) müssen solche Risiken und Nutzen sorgfältig abgewogen werden, bevor Entscheidungen zur Bewirtschaftung getroffen werden. Die Erfahrungen mit dem Management von NNT in städtischen Gebieten, Stadtrandgebieten, ländlichen Gebieten und Wäldern sind häufig lokal oder regional fokussiert und ein überregionaler Austausch findet nur selten statt. Angesichts der Herausforderungen im Umgang mit NNT sowohl in Bezug auf den Nutzen als auch die Risiken ist jedoch ein europäischer transnationaler Ansatz erforderlich, um die Rolle von NNT in zukünftigen AS-Ökosystemen zu beurteilen. Ziel ist es, mit Hilfe eines integrierten Systems zur Unterstützung der Entscheidungsfindung eine transnationale Strategie für den verantwortungsvollen Umgang und ein nachhaltiges Management von NNT im AS bereitzustellen. Das Projekt steht in Zusammenhang mit nationalen und regionalen Richtlinien, die darauf abzielen, die biologische Vielfalt zu schützen und zu verbessern, um eine ökologische Vernetzung sowie kulturellen Ressourcen zu fördern und gleichzeitig ein hohes Maß an Widerstandsfähigkeit und Ökosystemleistungen im gesamten AS zu erhalten. Die Aktivitäten zur Umsetzung des ALPTREES-Projekts umfassen

1. die Entwicklung einer umfassenden Datenbank über NNT,
2. die Projektion der aktuellen und potenziellen Verteilung von NNT im AS anhand von Klimawandel-Szenarien,
3. die Bestimmung ihres Invasionspotenzials und
4. die Analyse der verschiedenen von NNT erbrachten Ökosystemleistungen, um die Wechselwirkungen zwischen Risiken und Nutzen zu bewerten.

ALPTREES wird Managementempfehlungen für NNT unter verschiedenen Klima- und Wirtschaftsszenarien formulieren, die auf den Erfahrungen aus Probeflächen-Erhebungen in Verbindung mit Modellprojektionen, Citizen Science und zahlreichen Stakeholder-Treffen basieren. Mit Hilfe von Policy Briefs, einem Handbuch der gewonnenen Erkenntnisse, transnationalen Pilotaktionen für beste Managementpraktiken und einem interaktiven Online-Entscheidungsunterstützungssystem wird eine enge Zusammenarbeit mit den Interessengruppen und deren Nutzen sichergestellt. Ein weiteres innovatives Ergebnis des Projekts ist eine offene ALPTREES-Wissensplattform, die den transnationalen und interdisziplinären Wissenstransfer unterstützt.

Slovensko (Slovenian)

Pričakovane koristi in potencialna tveganja, ki jih prinašajo tujerodne drevesne vrste (TDV) v evropski prostor so razdelila mnenja strokovnjakov in zainteresirane javnosti. Koristi TDV vključujejo ublažitev in prilagajanje podnebnim spremembam, prispevke k bioekonomiji, mestni in obmestni zeleni infrastrukturi ter k omiljevanju naravnih nesreč. Vendar lahko TDV postane invazivna in s tem predstavlja tveganje za domačo biotsko raznovrstnost in delovanje naravnih ekosistemov. Lahko predstavlja tudi določena teganje v družbenogospodarski sferi. V kritičnih in ranljivih ekosistemih, kot je alpski prostor (AP), je pred sprejemanjem odločitev o upravljanju s TDV potrebno skrbno preučiti takšna tveganja in koristi. Izkušnje z upravljanjem TDV v urbanih, periurbanih in podeželskih območjih ter

gozdovih so pogosto specifične za regijo ali mesto in le redko dosežejo druga območja in deležnike. Glede na izzive pri upravljanju TDV, ki se tičejo koristi in tveganj, je potreben evropski nadnacionalni pristop k problematiki, kjer se opredeli vloga TDV v prihodnjih ekosistemih AP. Cilj projekta je zagotoviti nadnacionalno strategijo za odgovorno uporabo in trajnostno upravljanje s TDV v alpskem prostoru s pomočjo integriranega sistema za podporo odločanju. Projekt se ujema z nacionalno in regionalno politiko, katere cilj je varovanje in povečanje biotske raznovrstnosti, zagotovljanje ekološke povezanosti in kulturnih virov, hkrati pa se ohranja visoka stopnja odpornosti in ekosistemskih storitev v celotni alpski regiji. Dejavnosti izvajanja projekta ALPTREES vključujejo

1. razvoj obsežne baze podatkov o TDV,
2. načrtovanje trenutne in potencialne razširjenosti TDV v AP glede na različne scenarije podnebnih sprememb,
3. določanje invazivnega potenciala TDV in
4. analiza različnih ekosistemskih storitev, ki jih zagotavljajo TDV za oceno kompromisov med tveganji in koristmi.

Projekt ALPTREES bo oblikoval priporočila za upravljanje s TDV v različnih podnebnih in gospodarskih scenarijih, ki bodo temeljili na izkušnjah iz pilotnih območij v kombinaciji z modelnimi projekcijami, ljubiteljsko znanostjo in več srečanji deležnikov ter zainteresirane javnosti. S pomočjo poročil o politikah, priročnika pridobljenih izkušenj, pilotnih akcij za najboljše upravljavske prakse ter interaktivnega spletnega sistema za podporo odločanju, bo zagotovljena tesna interakcija deležnikov. Nov inovativen rezultat projekta je Odprt ALPTREES Center Znanja (Open ALPTREES Knowledge Hub), ki bo podpiral nadnacionalni in interdisciplinarni prenos znanja.

Italiano (Italian)

I benefici attesi e i rischi potenziali delle specie di Alberi Non Nativi (Not Native Trees, NNT) per le regioni geografiche europee hanno polarizzato le opinioni di esperti e cittadini. I vantaggi dell'uso di tali specie includono l'adattamento ai cambiamenti climatici (CC), i contributi alla bioeconomia, le infrastrutture verdi urbane e periurbane e la mitigazione dei pericoli naturali da parte degli NNT, mentre i rischi comportano l'invasività di queste specie NNT e gli effetti sulla biodiversità naturale. In ecosistemi vulnerabili come Alpine Space (AS), tali rischi e benefici devono essere attentamente considerati prima di prendere decisioni sulla loro gestione. Le esperienze nella gestione di NNT nelle aree urbane, nelle aree periurbane, rurali e nelle foreste sono spesso specifiche per paese/città e quindi raramente condivise. Date le sfide nella gestione degli NNT in termini sia di benefici che di rischi, è necessario un approccio transnazionale per qualificare il ruolo degli NNT nei futuri ecosistemi di AS. Pertanto, l'obiettivo è fornire una strategia transnazionale europea per un Sistema di Supporto alle Decisioni sull'uso responsabile e la gestione sostenibile di NNT nella AS. Il progetto si inserisce nel contesto della politica nazionale e regionale derivata dal sito che mira a proteggere e migliorare la biodiversità per garantire la connettività ecologica e le risorse culturali mantenendo un alto livello di resilienza e di servizi

ecosistemici (ES) in tutti gli AS. Le attività di implementazione del progetto ALPTREES includono:

1. lo sviluppo di un database completo su NNT tra utti i partner AS;
2. presentare la distribuzione attuale e quella prevista degli NNT in AS in diversi scenari di CC;
3. determinare il potenziale invasivo degli NNT nei diversi ambienti dello AS e
4. analizzare i diversi ES forniti da NNT per valutare i possibili compromessi tra rischi e benefici.

Nel progetto ALPTREES formuleremo raccomandazioni di gestione per la NNT in diversi scenari climatici ed economici attraverso incontri con le parti interessate, riassunti delle politiche, un manuale di lezioni apprese e azioni pilota transnazionali per le migliori pratiche di gestione. Un risultato innovativo del progetto è l'Open Knowledge ALPTREES, che supporterà il trasferimento di conoscenze transnazionali e interdisciplinari.

Français (French)

Les avantages attendus et les risques potentiels des arbres non natifs (NNT) pour les régions géographiques européennes ont polarisé les opinions des experts et des citoyens. Les avantages comprennent l'atténuation du changementclimatique (CC) et son adaptation, les contributions à la bioéconomie, aux infrastructures vertes urbaines et périurbaines et à l'atténuation des risques naturels. Cependant, les NNT peuvent devenir envahissants et donc présenter des risques pour la biodiversité endémique, le fonctionnement des écosystèmes ou la socio-économie. Dans les écosystèmes critiques et vulnérables tels que l'Espace alpin (EA), ces risques et avantages doivent être soigneusement pris en compte avant que des décisions de gestion ne soient prises. Les expériences en matière de gestion des NNT dans les zones urbaines, périurbaines, rurales et forestières sont souvent spécifiques à une région ou à une ville et rarement partagées. Étant donné les défis que pose la gestion des NNT, tant en ce qui concerne les avantages que les risques, une approche transnationale européenne est nécessaire pour qualifier le rôle des NNT dans les futurs écosystèmes de l'EA. L'objectif est de fournir une stratégie transnationale pour une utilisation responsable et une gestion durable des NNT dans l'EA avec l'aide d'un système intégré d'aide à la décision. Le projet s'inscrit dans le contexte d'une politique nationale et régionale basée sur des retours d'expérience visant à protéger et à améliorer la biodiversité pour assurer la connectivité écologique et les ressources culturelles tout en maintenant un niveau élevé de résilience et de services écosystémiques dans l'ensemble de l'EA. Les activités de mise en œuvre du projet ALPTREES comprennent

1. le développement d'une base de données complète sur les NNT,
2. la projection de la distribution actuelle et potentielle des NNT dans l'EA selon des scénarios de CC,
3. la détermination de leur potentiel d'invasion et
4. l'analyse des différents services écosystémiques fournis par les NNT pour évaluer les compromis entre risques et bénéfices.

ALPTREES formulera des recommandations de gestion pour les NNT dans le cadre de différents scénarios climatiques et économiques, sur la base de l'expérience acquise sur des placettes d'échantillonnage combinées à des projections de modèles, à la science citoyenne et à des réunions avec de multiples parties prenantes. Grâce à des notes d'orientation, un manuel des enseignements tirés des retours d'expérience, des actions pilotes transnationales pour les meilleures pratiques de gestion et un système interactif d'aide à la décision en ligne, une interaction étroite entre les parties prenantes et des avantages seront garantis. Un autre résultat novateur du projet est le centre ALPTREES de ressources, outil support opérationnel pour un transfert transnational et interdisciplinaire des connaissances acquises grâce au projet ALPTREES.

Link to Project Homepage

https://www.alpine-space.eu/projects/alptrees/en/home

Introduction

Climate change poses major threats to Alpine ecosystems. The Alpine Space (AS) covers a wide gradient including Mediterranean and Atlantic influences in the South and West to continental influences in the East (Böhm et al. 2001). In the past, mountain ecosystems have been less affected by non-native tree species (NNT) due to harsher conditions, less intensive land use and reduced human activity in high elevation (Dainese et al. 2013, Petitpierre et al. 2016). Climate change is resulting in prolonged growing seasons and less severe winters (Walther et al. 2002) and thus changing growing conditions. The potential and rate of spread into higher elevations is expected to further increase in the future (Becker et al. 2005, Dainese et al. 2013, Petitpierre et al. 2016). Petitpierre et al. 2016 predicted the optimal suitability for NNT to shift from lowland to the montane or even subalpine zone.

Human influence on the spread of NNT includes anthropogenic disturbances, like direct land-use changes that create niches for NNT, human population density, increasing mobility and development in mountainous areas (Dainese et al. 2013, McDougall et al. 2010). These will further enhance the colonization, persistence and invasion by increasing propagule pressure (Chytrý et al. 2008). The results of further studies confirmed the importance of the human impact (Marini et al. 2011, Alexander et al. 2016) on the increase of NNT. Therefore, adaptation efforts are required to respond to the challenges of the invasive potential of the NNT on the Alpine environment, economy & society.

Native tree species are increasingly affected by pests, diseases, drought, and increased temperatures (Allen et al. 2010), and many of them are now considered threatened in Europe (Rivers 2019). Commercially important forest tree species such as Norway Spruce Spruce (*Picea abies* (L.) H. Karst.) or European Beech (*Fagus sylvatica* L.) have turned out to be susceptible to increasing summer drought (Albrecht and De Avila 2018). CC is therefore critical for forest management because tree species have to be carefully selected for cultivation many years before being harvested. Several NNT such as Douglas fir

(*Pseudotsuga menziesii* (Mirb.) Franco) are being valued for their perceived suitability to adapt European forests to CC (Vitali et al. 2017) and their cultivation will likely be intensified in the future. Douglas fir has been discussed as an alternative tree species for Norway spruce (*Picea abies*) especially at low elevations in Central Europe (Roques et al. 2019,Klimo and Hager 2000, Roloff and Grundmann 2006) due to their drought tolerance and superior productivity (Chakraborty et al. 2015, Chakraborty et al. 2018). Many NNT species have a long history of cultivation in Europe such as the Douglas-fir . However, there have also been concerns regarding the invasive potential of Douglas-fir in certain sites in Europe (Bindewald and Michiels 2018, Tschopp et al. 2015).

Simultaneously, some NNT which are able to cope with increasing temperatures like the black locust (*Robinia pseudoacia* L.) (Nadal-Sala et al. 2019) can play an important role in cities to respond to CC. For instance, planting such NNT can improve the urban environment by reducing heat island effects and promoting better air quality (Pregitzer et al. 2018). Yet, awareness has also increased about undesirable detrimental impacts associated with the introduction of NNT and several species are considered invasive (Castro-Díez et al. 2019, Keča et al. 2019). For example, some NNT like black locust spread from cultivated sites in semi-natural environments where they pose risks to biodiversity, ecosystem functioning or socio-economy (Campagnaro et al. 2018, Vítková et al. 2017).

Nevertheless, Urban, Peri-Urban and Forest Ecosystems provide crucial goods and services such as attractions for tourism and recreation as well as climate and biodiversity conservation. NNT can support the adaptation of European forests and urban areas to CC, but simultaneously entail risks for biodiversity and ecosystem functions. Walter et al. 2005 defined changes in species composition, in succession patterns and in nutrient cycling as the most important environmental effects of NNT propagation. It is important to address the patterns and impacts of NNT dispersal in the AS in order to provide a useful set of guidelines for managers, as for example forest management has a regulatory effect on the distribution of NNT (Martin and Marks 2006, Matlack and Schaub 2013).

Tackling territorial challanges

Efforts have already been undertaken to responsibly manage NNT and forestry has experiences with responses of potential invasive tree species to their local management (Sitzia et al. 2015). However, neither European, national nor regional strategies for the management of NNT in the AS consider the challenges of CC yet. Moreover, the lack of a consistent methodology to assess the invasiveness of NNT in Europe hampers the comparison of risks across regions and national jurisdictions (Bindewald et al. 2019). This has led to an incoherent patchwork of local strategies for NNT in the AS. Under a prudent estimation, currently, ca. 4% of the European forest area (8.5mio ha) is covered with over 150 different NNT species (Brus et al. 2019). Furthermore, a yet not well-known number of NNT are cultivated as ornamentals in (peri-) urban areas. In order to formulate science-based policies for biodiversity conservation while balancing the trade-offs between forest health and ecosystem services, it is important to not only quantify the range of benefits but

also the risks linked to biodiversity. The common territorial aim is therefore to identify current and future benefits as well as detrimental impacts of NNT in the AS (Fig. 1).
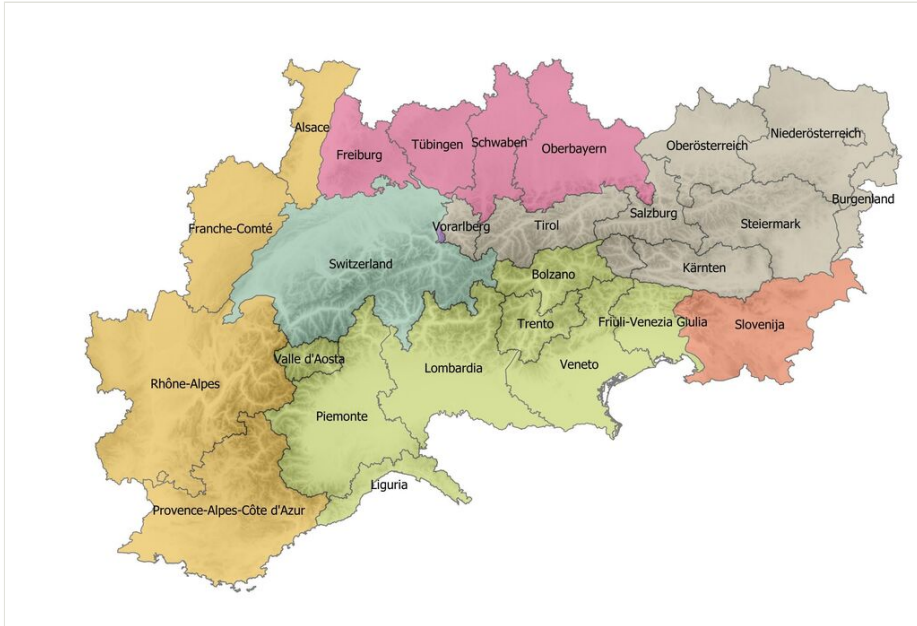

Figure 1. doi
ALPTREES Regions.

Map of the Alpine Space region (AS) showing the target territory for the application of the strategy of NNT to be developed in the ALPTREES project. The presence of non-native species in local ecosystems is becoming more common and more challenging to manage, yet NNT management methods and related regulations are often country-specific and not shared regionally/transnational, especially in the Alpine space region.

Target groups

Stakeholders and residents of the Alpine Space and their future generations will benefit from the sustainable action for CC adaptation, mitigation, and a system change for ensuring ecosystem services. Regional, national and local policymakers, landowners, public authorities, urban planners, regional agencies, and NGOs will benefit from a comprehensive strategy providing valid input for their governance strategies. Conservation managers, forest businesses and alpine communities will be provided with a handbook helping them to optimize their management of NNT in a sustainable and cost-efficient manner. The objectives and nature of activities of ALPTREES follow strategic policy developments in the policy cycle involving analytical assessments aiming at elaborating a transnational strategy for NNT in the AS (Table 1).

Table 1.

Target groups of the ALPTREES project.

Target groups	Please further specify the target groups
local public authority	Municipalities in the AS
regional public authority	Regional public authorities will benefit from comprehensive strategy that provides valid input for their governance strategies.
national public authority	National authorities are representative of national ministries and benefits from comprehensive strategy that provides valid input for their governance strategies.
sectoral agency	Regional agency dealing with forestry, ecology and sustainable development, can gain from comprehensive strategy for valid governance strategies.
infrastructure and (public) service provider	Provision of CC and NNT risk management tools for environmental service provider and urban service provider (e.g. tree safety and tree health in cities)
interest groups including NGOs	Various NGOs (nature conservation, education,forest protection, rural development)will be invited to participan on pilot actions.
higher education and research	Forest/ environment/ agriculture. Univeristies/research centres will be able to use developed database
education/training centre and school	Forest/environment educational institutions and local schools; horticulture schools and Local VETs (Vocational Education and Training) institutions for forestry, wood, horticulture and natural environment
enterprise, excluding SME	Forest & wood, horticulture & gardening, and Shorth Rotation Forestry (SRF; wood for energy)enterprises
SME	Forest & wood, horticulture & gardening, and Shorth Rotation Forestry (SRF; wood for energy) enterprises
business support organisation	Consultancy forest/nature conservation/rural planning agencies;
International organisation under national law	Constribution to international policies; Observer include international organisation
International organisation under inter-national law	Transnational cooperation strategies will provide technical guidance to International organisation under inter-national law; certification bodies e.g. PEFC and FSC
General public	Citizens of AS, aim is to increase the awareness and knowledge of NNT

Project objectives and outputs

The overall objective of ALPTREES is to improve knowledge-based decision-making on the responsible use and management of NNT in the AS by developing a transnational strategy. This strategy will evaluate the tradeoffs between promoting CC adaptation through planting adapted NNT while preserving and enhancing biodiversity, ecosystem services and cultural resources of natural forests. Based on scientific analysis, also with the help of a Citizen Science approach, ALPTREES' strategy of sharing knowledge on challenges and best practices as well as the establishment of a transnational network to learn from each other and take advantage of synergies will significantly contribute to the

protection, conservation and connectivity of Alpine Space ecosystems. The specific objectives are:

1. Increasing knowledge on the current and prospective status of NNT in the AS: transnational inventories of policies, NNT distributions, threats, management measures and ecosystem services.
2. Development and implementation of a unified homogeneous and science-based solution strategy for NNT in the AS.
3. Increasing public awareness and capacity building on the responsible use of NNT through dialogues between science, administration, and citizens.

Contribution to regional strategies and policies

NNT are being discussed as an alternative to adapt European forests to climate change, in the likelihood of a drastic reduction in the distribution range of native tree species in climate change (Dyderski et al. 2017). The growing importance of NNT for European CC adaptation measures is increasingly reflected in policy frameworks. At the same time, invasive NNT can seriously affect nature conservation goals, economic activities, livelihoods, food security, and human health and well-being, and thus bear the risk of undermining progress towards sustainable development as also impeding achieving the United Nations, (2015-2030) Sustainable Development Goals (SDGs). Utilizing the true potential of NNT in the Alpine space while safeguarding the native ecosystems from potential threats of the NNT is thus crucial. A wide range of policy instruments and framework exists which can guide science-based management of NNT in the Alpine space (Table 2).

Table 2.

Some examples of Policy frameworks and their potential role in the management of NNT in the Alpine space.

Policy framework	Potential role
Convention on Biological Diversity	provision of guidance for safeguarding native biodiversity
Dir.92/43/EEC	preserving, protecting and improving the quality of the environment through a risk assessment of NNT and supporting the coherent European ecological network by integrating NATURA2000 sites in pilot actions
EU IAS Reg.1143/2014	early detection of potential risks from NNT; providing information on measures, costs and management options
European Strategy for the AS: EUSALP Action Groups (AG) Obj. 3: Action 6,7,8	to strengthen cooperation between AS partner countries to address common challenges in a more effective way
EU Strategy on adaptation to CC & Green Infrastructure	ensuring that the AS's green infrastructure is made more resilient against natural and man-made disasters

In addition, ALPTREES will help to strengthen the sustainable use of natural resources under CC (Action Group 6 of EUSALP) by addressing potential conflicts between

stakeholders such as forestry, nature conservation and environmental protection. Outputs for site-specific evaluation of NNT risk/benefit, trade-offs will support the Action Group 8 of EUSALP to improve risk management; the results will provide solutions for protecting against natural and man-made disasters and improving CC management. The project will also target the ecological connectivity of urban, peri-urban and rural areas Action Group 7 of EUSALP.

Project structure

The Alptrees consortium consists of 12 project partners (PP) from seven countries in the AS. Additionally, a network of 32 observers outside the PPs is invited to actively advising on the project development. The project activities are structured in thematic work packages (WP), which includes management (WPM) and a communication work package (WPC). Technical WPT1 aims to analyze the spatial extent for potential or existing invasive NNT in the AS. This information is essential for risk/benefit and trade-off analysis and therefore for underpinning decision-making including prioritization of sensitive areas of high conservation value. Under WPT2 Risk maps will be developed based on CC projection models, with special emphasis on the forest area, urban forests, the peri-urban interface, and urban trees. These products are essential to support tools for CC adapted decision making in the public and private space. WPT3 will focus on the transfer of knowledge generated in the project to end-users at different levels. Preliminary project results will be shared first with observers, stakeholders and experts from the AS in 2 Transnational Stakeholder Seminars and various separate stakeholder workshops in each AS country during which the Open ALPTREES Knowledge Hub will be furnished with contents. The objective of WPT4 is to provide a transnational strategy for knowledge-based decision-making on responsible use and management of NNT in the AS. Stakeholder commitment will be widely encouraged to integrate diverse knowledge and perspectives into the management of invasive species and to deal with potential conflicts of interest.

Communication strategy

Communication improves the understanding of the responsible use of NNT for CC adaptation of European forests and urban areas. Yet, a communication strategy requires cross-sectoral and transnational cooperation to secure the biodiversity, ecosystem services and cultural resources of native forests against the invasion risks that could be represented by NNT. The knowledge gained in the ALPTREES project through transnational cooperation of experts in the ALPTREES PP consortium will be shared through formal and non-formal education tools. In a series of public events both at the national and international levels, like movies/documentaries, scientific conferences, public talking, school activities, forest and horticulture professionals, the PPs will educate stakeholders to engage with science and administration for sustainable development of the biodiversity in the AS. All the communication activities will follow the bottom-up approach "listen – observe – inspire". The activities will target local policymakers, stakeholders from the forestry industry and urban/rural planning, along with the general public (Table 1).

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Funding program

Grant title

A Transnational Cooperation for Sustainable Use and Management of Non-Native Trees in Urban, Peri-Urban and Forest Ecosystems in the Alpine Region.

Hosting institution

Austrian Research Centre for Forests (BFW), Vienna, Austria

Ethics and security

The idea in this proposal is the property of the ALPTREES project and it partners. Further circulation of this proposal is welcome with reference to the ALPTREES project.

Author contributions

Lead project partner, BFW, Vienna developed the idea of the proposal and the other project partners from Austria, Germany, France, Slovenia and Italy contributed by editing and providing inputs.

Conflicts of interest

The authors and contributors declare no conflict of interest.

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