





UPDATE OF THE PLAN FOR THE EXPLOITATION AND DISSEMINATION OF RESULTS

CHARTER Deliverable D7.20

Grant Agreement Number: 869471 Project Acronym: CHARTER Project title: Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity Starting Date: 01/08/2020 Project Duration: 54 months Project Officer: Alberto Zocchi Project Coordinator: Bruce Forbes / LAY Authors: CHARTER coordination team / LAY Contributing partners: UNILIV







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D7.7	PEDR plan	M6
D7.8	Stakeholder Analysis Template designed and used	M12
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D7.9.	CHARTER infographic	M12
D6.2	Mapping of stakeholder network required for the codesign of pathway narratives by means of a social network analysis	M33
D6.4	Co-design of policy options to inform climate adaptation and mitigation policies and practices and enhance the viability and resilience of Arctic local livelihoods	M52
D6.5	Cross-cutting work to develop Arctic strategy and provide policy recommendations	M52
D7.15	Evaluating the impacts of CHARTER science-policy dialogue	M52
D7.16	List of created scientific publications	M52





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Abstract

The efficient dissemination and exploitation of important research results produced within the project is one of the key objectives of the CHARTER Consortium. The aim of this deliverable is to report on the envisaged dissemination and exploitation activities of the project results. The Plan for the Exploitation and Dissemination of Results (PEDR) summarizes the consortium's strategy and concrete actions to disseminate, exploit and protect the results generated within the project.

The Plan for the Exploitation and Dissemination of Results is one of the compulsory reports required to be submitted to the EC by all H2020 projects. The current document presents the CHARTER Dissemination and Exploitation Plan (PEDR), as this is defined up to the end of the project's month 6. The two key areas addressed by this deliverable are the dissemination and the exploitation actions which are separately reported in Section A and Section B of the PEDR (Appendix – CHARTER Plan for the Exploitation and Dissemination of Results). Section A of the PEDR (see Appendix) describes the dissemination activities which demonstrate the added-value and positive impact of the project on the European Union. Dissemination activities will be performed during the four years of the project (August 2020 – July 2024) and after the end of the project. Across the first year, activities will focus on amplifying the public awareness about the project's concept, objectives and expected impact through various publications, press releases, videos, participations at conferences and events. This initial deliverable aims at the presentation of a suitable dissemination plan for making the project and its results known. Section B of the PEDR (see Appendix) provides guidelines for the strategic exploitation plan to be carried out jointly from Consortium partners or by individual partners. This initial deliverable aims at presenting the exploitation scenarios, and the IPR regulating issues.

The deliverable is structured in the following six chapters. The first section includes introductory information about the scope and objectives of the dissemination and exploitation activities within the CHARTER project. The second section presents the conceptual framework adopted for the development of the CHARTER Dissemination Plan, while the third section focuses on the performance assessment of the performed dissemination activities. The fourth section presents the exploitation strategy and activities of the project, and the fifth section describes the mechanisms for knowledge management and protection of intellectual property rights (IPR). Finally, the last chapter includes the concluding remarks of the deliverable.





1. Introduction

Research innovation is a driving force for economic growth, the creation of new job opportunities and the enhancement of the standard of living. It is therefore important to ensure that the knowledge generated within research and innovation projects is properly diffused and that the means through which such knowledge can be delivered to the society are being effectively explored. The Horizon 2020 projects should demonstrate a high level of innovation in their PEDR plans. Concrete measures to enhance the innovation capacity and integration of new knowledge and an innovation potential have to be presented.

CHARTER defines innovation as a process of creating something new that can contribute to better quality of life. In our context this means advancing adaptive capacity of Arctic communities to climatic and biodiversity changes and codeveloping strategies and policy pathways for locally and regionally critical livelihoods. The participatory approach including the cross-cutting and co-designing approaches can be seen as a crucial part of CHARTER's innovation management since they create the proper conditions to make the objectives and outcomes of the project commonly understood and they contribute to achieve them to provide benefits for academia and the general public.

Communicating research results can effectively accelerate research and technical development, going beyond the current state of the art, and even creating new research horizon lines on future and emerging trends. Furthermore, participants get these benefits through dissemination activities, such as participation in workshops or publication of information in websites.

All the above significantly contribute to the sculpture of a European 'Innovation Union' profile, while they also account for public spending and provide tangible proof that collaborative research adds value by:

- Showing how European collaboration has achieved more than would have otherwise been possible; notably in achieving scientific excellence, contributing to competitiveness and solving societal challenges;
- Showing how the outcomes are relevant to our everyday lives; by creating jobs, introducing novel technologies, or making our lives safer;
- Making better use of the results; by ensuring that these are taken up by the decision makers and the scientific community.





Dissemination and Exploitation therefore include the entire set of activities aiming to present and discuss the project outside the Consortium members so as to enhance its scientific impact and the potential of market uptake of its results. The terms "exploitation" and "dissemination" are defined under the Horizon 2020 Rules for Participation as follows:

- dissemination "means the public disclosure of the results by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium".
- exploitation "means the use of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardization activities";

A commonly agreed Plan for the Exploitation and Dissemination of project results (PEDR) is necessary in order to ensure the effective communication of knowledge by all partners, and also the establishment of a common strategy, that is supported and amplified by the entire consortium.

During the first months of the CHARTER project, WP7 activities focused on the creation of effective public communication channels and tools towards raising public awareness for the project objectives and expected results. Towards the realization of this objective, the CHARTER Consortium identified dissemination activities which could be performed in order to disseminate the project results to more specific channels, related scientific and decision maker groups and Arctic communities, transferring knowledge and fostering new collaborations.

Russia's invasion of Ukraine is having an impact on the CHARTER project, and the reorientation of project activities away from the Russian Arctic also impacts the exploitation and dissemination activities.

1.1. Objectives and scope of the PEDR plan

The present deliverable contains an overview of the dissemination and exploitation strategy applied by the CHARTER consortium to effectively distribute the results generated within the project to the relevant target audiences based on their interests and in a comprehensible manner. In particular, it indicates the guiding principles and tools for the dissemination and exploitation activities, reports on the envisaged related activities of the project and on the identified processes for the efficient monitoring and safeguarding of the IPR of the involved partners.





The dissemination and exploitation plan has been developed towards addressing the following questions [European Commission, 2014 "Communicating EU research and innovation guidance for project participants", September 2014]:

- What and why of prime importance?
- Who? To whom?
- Says what?
- How and in which channels?
- With what effect?

The PEDR will need to be updated during the implementation of the project (Figure 1) and beneficiaries are required to report periodically to the European Commission the concrete dissemination and exploitation activities carried out. These activities should be consistent with the PEDR and proportionate to the impact expected from the action. At the end of the project the final report should include the final version of the Plan for the Exploitation and Dissemination of the Results that will allow the European Commission to assess the impact of the project.

CHARTER is required to include an updated or confirmed Plan for the Exploitation and Dissemination of Results in both the periodic and final reports, explaining how achieved results are exploited and disseminated. Updating the PEDR plan is considered in the end of the first reporting period (month 18) and the plan is to be updated latest on month 34 (31.5.2023).

The role of the CHARTER PEDR plan is to ensure the highest impact of the project outcomes, the protection (including Intellectual Property Rights), co-dissemination (with stakeholders), innovation management, and co-exploitation of the project results. Concretely, this will be implemented throughout the lifetime of CHARTER in three steps:

Step 1: Identify a result that is ready to be released. Such results can be either the major results ("Tools and data") or more concrete and intermediate results/data but which may nevertheless be useful for specific processes (e.g. drafting of adaptation strategies) and users. Such results will be evaluated by WPs 6 and 7 in terms of their relevance to specific policy/management processes and stakeholders. Work Package leaders will identify results that are ready for evaluation and initiate the evaluation process together with WP7.

Step 2: Analyse the value of a result for the potential users and the appropriate way to release it. This process will lead to a clear recommendation about how and when to





release the result. Depending on the potential users, different formats, communication tools and channels will be selected (Open Access journal or databases, policy briefs, public communications, etc.)

Step 3: Use the results as impacts enablers. The results will follow closely the provisions described in the CHARTER Consortium Agreement (especially in Section 8 and 9) and paying close attention to the details concerning the IPR. Therefore, the partners who own the result will decide on its use, but ensure that the other partners (especially the coordinators of the PEDR) also have access to the results as needed for achieving the targets of the PEDR.



Figure 1: PEDR as a living document (source: EC/IPR Helpdesk)

1.2. Importance of dissemination and exploitation activities

Dissemination is a significant tool that is used to connect the consortium members, the stakeholders of the related scientific fields, and the general public to the achievements and activities performed within the project. Consequently, by effectively and strategically disseminating the project's results, greater public awareness is created as well as knowledge sharing, transparency and education are promoted. Also, the potential of exploitation of the project results is considerably increased.





The European Commission has made communication one of its strategic objectives, fully recognizing it as a policy in its own right. Research is an excellent subject for communicating the benefits and added value of European cooperation due to:

- The important role of R&D in building Europe's future as a competitive and sustainable society.
- The fact that public support for scientific research remains high while support for the EU generally has been declining (Eurobarometer, 2016).

Considering the above, EU-funded activities and projects distinctly contribute to the creation of new jobs, novel technologies and improve the citizens' quality of life. Public interest for research findings and achievements is increasingly growing over time. Moreover, since one of the main financers of such projects is the European taxpayer, a major objective of dissemination and exploitation activities is transparency in terms of the financial resources spent. Thus, it is an obligation to ensure: i) maximum return on the investment, and ii) full openness about actions financed.

Disseminating results and products means looking for maximum exploitation, so that as many potential users as possible can/could benefit from the results of the CHARTER project. For the CHARTER Consortium, proper dissemination of the important research results provides the maximum chance of success and impact.

1.3. Principles and key objectives of the CHARTER PEDR plan

It is important to ensure that the knowledge generated within research and innovation projects is properly diffused and that the means through which such knowledge can be delivered to society are being effectively explored. This is realized through the exploitation of products and services for informing policy, making sure that the results are available for stakeholders, regional, local and indigenous communities as well as national and international actors. This is the primary way of delivering research results to the citizens (end-users) for us. Furthermore, dissemination activities, such as participation in workshops or publication of information in websites, enable participants "to get feedback on pathways and enduser products".

The CHARTER related dissemination activities will aim at four different levels of involvement:





- **Dissemination for awareness** (for the audiences who do not need a detailed knowledge of the work and results, but outcomes of CHARTER could be useful to them): general information about the project and its results.
- **Dissemination for understanding** (directly targeting groups who would benefit from the outcomes of the project and the project itself would benefit from their support and feedback): detailed information about the project and its results.
- **Dissemination for action** ('action' refers to a change of practice resulting from the adoption of results offered by the project. Targeted audiences for this type of dissemination are groups/audiences that are in a position to 'influence' and 'bring about change'. These are the groups/audiences that will need to be equipped with the right skills, knowledge and understanding of the work in order to achieve real change): detailed information about the project and its results.
- **Dissemination for exploitation:** in an effective, timely and consistent manner to: i) the relevant scientific community (e.g. Academic Institutions, Research agencies/establishments), ii) local Arctic communities and livelihoods, iii) policy makers, as well as iv) the wider public. Exploitation does not only refer to commercial exploitation but to all types of exploitation that the project's foregrounds may have.

CHARTER has two cross-cutting themes "Tools and data for Arctic Strategies", and "Public dialogue on the Arctic", developed precisely to support the dissemination and exploitation of the results.

2. CHARTER dissemination plan

2.1. Methodology

Following are presented the methodological steps followed for the development of the CHARTER PEDR plan, according to the guidelines provided by the EC ["Guidance Notes on Project Reporting"].

Step 1: Conceptual Design of the Plan: The first step involved the identification of the goals and objectives of the CHARTER dissemination and exploitation activities.





Step 2: Templates to plan and monitor the dissemination and exploitation activities and collect input from the partners were designed. The completed templates are presented in the Appendix.

Step 3: Detailed Plan Development: The completion of these templates with the dissemination and exploitation activities is followed by the analysis of the received input and regular development of the CHARTER Plan for the Exploitation and Dissemination of Results.

Through the analysis of the received input from the partners, the CHARTER target audiences were identified, which enabled the Coordinator and CHARTER partners to select the most cost-effective ways to communicate with them. Within the target audience, there are groups of interest which are groups of individuals that have an interest or are going to be affected by the significant research results produced within the CHARTER project. These groups of interest may be within the Scientific Community (higher education, Research), Arctic livelihoods, Civil Society, Policy Makers, Medias, General public, etc.

In addition, the communication measures used for transferring the messages to the target audiences were considered. There exist three main categories of communication measures:

- Interpersonal communication: Workshops, presentations, demos, etc.
- Written communication: Newsletters, bulletins, media releases, scientific publications, etc.
- Technology-based: Internet, e-mail, voicemail, video conferences, etc.

All measures have inherent strengths and weaknesses, so it is essential to adopt a combination of all of them in our dissemination strategy in order to take advantage of their strengths and minimize the impact of their weaknesses. CHARTER has a separate Communication plan, where these aspects are discussed further.

Step 4: Plan Execution of activities: The phase of execution of activities puts in practice all actions described in the PEDR plan. The objectives of this phase are:

- To implement activities as defined in the PEDR plan.
- To enable bi-directional communication paths for the channels selected.
- To increase visibility about the CHARTER project, its objectives and expected results.

From the beginning of the dissemination phase and with the objective of promoting future exploitation opportunities, all members of the consortium have realized that





their role is significant towards contributing to the implementation of activities depending upon their field of expertise and area of influence.

Step 5: Plan Evaluation: This step includes the monitoring, update and evaluation processes of the Dissemination and Exploitation activities throughout the project lifecycle. In particular, the CHARTER PEDR plan will be regularly monitored in order to ensure that the dissemination and exploitation activities are adequately performed. In addition, if deviations occur, the regular monitoring of the plan will enable the Coordinator and the Project Office to intervene and keep the plan on track.

In addition to this deliverable (and its update), several CHARTER WP6 and WP7 deliverables are targeted to maximize our impact and to assure that the dissemination and exploitation goals are met:

- D7.8: The Stakeholder Analysis Template is designed and used to identify the groups, their potential influence on generating impact and interest in our research.
- D7.9: Planning and designing an introductory poster showing through a comprehensive infographic the main idea of the project and its expected outcomes, and supporting the design of the policy briefs.
- D7.10: establishing the Expert Advisory Group.
- D7.11-D7.13, D7.17: Annual reports and meetings of the Consortium, Steering Committee and the Expert Advisory Group
- D6.2: Mapping of stakeholder network required for the co-design of pathway narratives by means of a social network analysis
- D6.4: Co-design of policy options to inform climate adaptation and mitigation policies and practices and enhance the viability and resilience of Arctic local livelihoods. This involves white papers about policy options for maintaining livelihoods and biodiversity.
- D6.5: Cross-cutting work to develop Arctic strategy and provide policy recommendations. This involves townhall events and world cafes for discussion and dissemination, forum piece -types of texts, and policy briefs.
- D7.15: Evaluating the impacts of CHARTER science-policy dialogue, based on qualitative interviews with policy- and decision-makers in the region, about their knowledge of CHARTER's research themes, linked with a Social Network Analysis.
- D7.16: List of created scientific publications





2.2. Building the CHARTER community

Our consortium comprises 21 funded institutions from 6 EU-member countries and 3 non-EU countries, as well as non-EU partners (USA, Russia, China), which will utilize non-EU funding instruments and various forms of in-kind support (i.e. supercomputer access for modelling, unpublished datasets etc.). The consortium is relatively large. The main reason for this is to be able to grapple successfully with the great complexity embedded within specifics of the Horizon 2020 Cryosphere call. Requesting in-depth research on drivers and implications of changing Arctic biodiversity and climate would be challenging enough in a standard purely biophysical call. However, by adding impacts on indigenous populations and local communities and asking for analyses of combined human and natural influences, the Cryosphere call has itself drastically reduced the potential pool of research teams globally, much less within the EU, able to successfully tackle these questions at the relevant diversity of spatial and temporal scales, ranging from decades to millennia and from individual herding households and districts to entire regions. Our consortium is carefully assembled with several aims in mind: (1) depth and breadth of Arctic field and/or lab experience, regardless of career stage or gender; (2) proven ability to work successfully and disseminate findings in truly interdisciplinary teams; (3) ability to bring relevant existing biodiversity/cryosphere/socio-cultural datasets to the table from previous or ongoing national, Nordic, EU and internationally funded projects; (4) ability to enable analyses of complex social-ecological datasets across local, regional and circumpolar scales; (6) ability to engage intimately and ethically with indigenous and local communities; (7) strong ambition to manage risks and succeed; and (8) last but not least, collegiality.

These characteristics of the consortium increase the probability of reaching the ambitious aims of the CHARTER, and make efficient dissemination and exploitation (maximizing the impact) of the results easier. All partners have resources for and are committed to the dissemination and exploitation of the results.

Our dissemination strategy will rely on diverse sources of expert competence in science itself, and in science communication, each competence addressing the communication and outreach activities to targeted audiences through their specific and dedicated tools throughout the project. The combination of science communication expertise acts as the tool for scientists to translate their results and conclusions into various formats (e.g. lay-person, scientific) depending on the target audience and as a channel to facilitate their dissemination and understanding. Through this process, the Consortium is also meeting one of the objectives of the





Responsible Research and Innovation (RRI) by reinforcing the two-way communication as well as the delivery of the feedback to the concerned populations.

Dissemination, exploitation and communication are very tightly interconnected in CHARTER, and activities related to these will be carried out both by researchers themselves and science communication experts in different partner institutes, led by the LAY Science Communications unit. Especially significant are the collaborative efforts of **WP6** and **WP7** in disseminating and communicating the results. As **WP7** concentrates more in communicating the results to target audiences, dissemination activities of **WP6** take the form of participatory workshops, integrating the representatives of local communities throughout the life of the project, and coproduction of a policy-relevant dialogue. A significant fraction of the **WP6** person months (total of 78) will be allocated to dissemination tasks. Also other WPs will contribute to dissemination, communication and exploitation through participating into the cross-cutting themes, as coordinated by the **WP7**. Partners will support the CHARTER communication efforts through their communication department experience, expertise and channels.

CHARTER work packages have a high level of freedom and related responsibility. All work packages and their leaders are responsible for managing their WPs as selfcontained entities. The responsibilities of the WP-leaders include ensuring that the expected output of the WP will be delivered, and providing the interface between their WP and dissemination activities of CHARTER. All project partners are expected to actively engage into the dissemination and exploitation activities. Division of communication and dissemination responsibilities within CHARTER are detailed also in the Communication plan of the project.

The project will include inputs from the Expert Advisory Group (EAG). The EAG consists of selected experts who understand the project content and can discuss the interests of stakeholder groups and how the project can benefit the society and communicate with it. The experts represent, among others, ministries, reindeer herders and science communication professionals. The EAG will maintain close contact with the project and it can raise critical questions, comments and recommendations to the CHARTER partners. The EAG acts also as a bridge between the actual project and wider society, thus also enhancing the dialogue with policy makers. The EAG will be briefed by the Project Coordinator and the Project manager and, when relevant, other Project personnel.





2.3. Identifying the target audience

The key aspect in answering to end-user needs is to disseminate and communicate the appropriate information to the relevant and interested audiences in a concise, well-articulated, understandable and attractively packaged manner. Consequently, the first step towards developing a successful dissemination action plan relies on the identification and classification of the groups which need to be targeted.

Based on the concept, objectives and expected impact of the CHARTER project, several groups of interest have been identified already in the planning phase of the project (Table 1).

During the first 12 months of the project, a Stakeholder Analysis Template (Deliverable 7.7.) was designed and used to further identify the target audiences, their potential influence on generating impact, and interest in our research. This template remains applicable for the reminder of the project, with the exception of the Russian target audiences. As a general principle, CHARTER will continuously identify the relevant public and stakeholders systematically in order to ensure marginalized groups are not ignored and in order to identify methods for improving stakeholders' interest in and engagement with our research. Particular attention would be given to groups/organizations with considerable influence but low interest in order to find ways in which the interest can be increased.





Table 1: Excerpt of stakeholder groups / target audiences for CHARTER

Stakeholder group / target audiences	Example	Aspects of participation, co-production of knowledge and dissemination
Local land users in different regions	Reindeer herders in Finland; Saami reindeer herders in Norway and Sweden, reindeer herders in Yamal; companies leasing land in pasture areas for resource extraction	Previously established contact; early consultation; free, prior and informed consent; on-site observations; participatory GIS; summaries of research findings in accessible language and format
Local communities in four countries	See Fig. 1.4a above for our core study region	Early consultation; well-advertised stakeholder workshops; respect for local languages; sensitivity towards divergent opinions; consideration of indigenous rights and other ethical issues; transcribed minutes of stakeholder workshops; summaries of research findings in accessible language and format; narrative scenarios developed in cooperation with the community; policy recommendations built upon previous local experience; Townhall meetings
World Reindeer Herders Association	Transnational and regional representatives	Early consultation; discussion on research design; exchange of data; inclusion of issues that deserve research from their point of view; summaries and detailed reports about research findings in (at least) English and Russian
Policy makers, ministries and land-use regulatory institutions	Ministry of Agriculture, Komi Republic; Reindeer Herders' Association in Finland, The Saami Reindeer Herders' Association of Norway, relevant EU institutions	Early consultation; discussion on research design; exchange of data; inclusion of issues that deserve research from their point of view; summaries and detailed reports about research findings in English and Russian
Organisations dealing with conservancy and environmental protection	Finnmárkku luonddugáhttenlihttu - Norges Naturvernforbund (Friends of the Earth Norway), Management bodies of protected areas (Natura 2000 network, within EU territory)	Early consultation; inclusion of issues that deserve research from their point of view; summary reports about research findings in (at least) English and Russian
Arctic Council	Sustainable Development Working Group of the Arctic Council	Accounting for Arctic Council's goals and working groups' agendas; summaries and detailed reports about research findings in English





General public		Project website; presentations and updates in regional and transnational media; cooperation with Frozen Ground cartoon project (IASC and IPA); proactive and
		conscious strategy of contributing to the "Public Dialogue on the Arctic"
Scientific community	Colleagues, students	Data and tools developed during the project, open access scientific publications, grey literature, sharing data and results in online repositories, databanks and portals, presentations at conferences, seminars, courses for students, video clips, town hall events

2.4. Defining the message

One of the main objectives of the planned dissemination and communication strategy is to communicate the right information to the right people at the right time using the right language. In order to approach the CHARTER target groups, it is required to clearly communicate the unsolved scientific problems CHARTER is trying to address and how the target groups can benefit from the results in their current practices. This information is the key message ensuring focused and effective dissemination, which can be seen as an essential success factor.

The project partners peer-review and check texts for leaflets, press releases and brochures before printing in order to combine the required level of quality and nonspecialized technical language where possible. The project language is English even though English is not the language of any country belonging to key geographical scope of CHARTER (Northern Fennoscandia). Therefore, in order to succeed, the project has to be able to communicate with the languages that people actually speak in the region, for instance by giving interviews in local languages and not in English when possible. Communications units of the project partners bring the results available in their own context, thus adjusting them to their own media reality.

Throughout the project CHARTER will continue formulating messages to target audiences based on the existing expertise in the network and scientific results. Based on the concept, objectives and expected impact of the CHARTER project, Table 2 showcases some groups of interest, which have been identified to be addressed as well as key CHARTER messages to deliver to each identified target group.





Table 2: Examples of CHARTER Target audiences and key messages to be delivered; some examples and their relation to the sustainable development goals (SDGs) given

Target audience	Key message	Communication measures
Scientific community (e.g. Academic Institutions, Research Agencies / establishments)	Dissemination of scientific results and expected benefits on materials design and processing technology of the project foregrounds. Improved framing of biodiversity drivers and feedbacks in contrasting SES contexts; Better understanding of long-term (centennial) development of land-use via	Scientific publications in open access, highly ranked journals and conference proceedings, presentations in conferences, seminars and workshops, educational material, courses for students etc. Grey literature like reports and white papers, sharing data and results in online repositories, databanks and portals, video
	Contribution to SDG15 (Life on Land) and SDG13 (Climate Action)	clips, town hall events.
Local Arctic communities and livelihoods	Improved preparation for and adaptation to extreme weather events (e.g. rain on snow (ROS)) in the short-term (1-10 yrs) and climate change in the longer term (decadal).	Electronic and web-based outreach tools (project website, social media, etc.), newsletters, newspaper, radio, TV, press releases etc.
	Improved framing of biodiversity drivers and feedbacks in contrasting social-ecological systems (SES) contexts; Better understanding of long-term (centennial) development of land-use via paleoecological data.	Simulation and model visualizations with infographics and key data, participatory workshops with local residents, regional administrators and local to regional policy makers.
	Contribution to SDG15 (Life on Land) and SDG13 (Climate Action)	
General public	Information related to the social impact of the project such as the new ambitious environmental goals, job opportunities, etc.	Newspaper, radio, TV, press releases, electronic and web- based outreach tools (project website, social media, etc) interviews, etc.





Policy makers	Information related to the innovations. Improved local and regional land-use maps and models,	Meetings, participation in ongoing policy processes through our Expert Advisory Group, e.g. ministerial working group "Future of reindeer
	Local innovation and improved adaptation to extreme weather events (sub-decadal) and climate change (decadal). Contribute and advance SDG11 (Sustainable Communities) and SDG15 (Life on Land). Creating narratives and pathways based on model and observational data that can offer policy options, as well as act as a dissemination tools for the public. Drafting roadmaps that are illustrative on how to ensure both ecological and socio-cultural sustainability of livelihoods in the Arctic while maintaining biodiversity	husbandry in Finland", 20202021. Simulation and model visualizations with infographics and key data, participatory workshops with local residents, regional administrators and local to regional policy makers. Engage critically to ongoing policy debates. Target debates to do with livelihoods: These include for example reindeer herding (e.g. herding limits and numbers), infrastructure development (wind-power parks, train line in N Norway /Sweden /Finland, mining), and forestry debates. Leverage the consortium's links to administrators and policy makers to maximize reach.

2. 5. Using the appropriate tools

The dissemination strategy increases the likelihood of success when exploring, evaluating and developing a framework of the most appropriate channels and tools of dissemination which are tailored to the different needs of all target audiences. In this context, the dissemination plan includes an efficient and effective mix of both interpersonal and mass communication tools which are briefly presented below.

CHARTER has a separate Communication plan, where the roles and responsibilities of Consortium partners are listed, and communication channels and tools are described further. It considers following aspects of communication/dissemination:

- Internal project communication
- External communication to wide audience





- Outreach tools and materials
- External communication to selected target groups and stakeholders
- Monitoring communication and visibility

Electronic and printed dissemination material: the visual identity of the CHARTER project was structured with the aim not only to boost CHARTER recognition but also to develop attractive dissemination material. CHARTER has its own logo, visual image and templates, available for all partners to utilize. A printed brochure is also not seen as needed, due also to the lack of physical meetings caused by the pandemic. The short project description can be printed from the website. If special needs arise during the project, related communication hand-out material will be produced. The project also identifies existing outreach tools such as established websites or newsletters that could be used to help the project. More information in the CHARTER Communication plan.

Project website: a dedicated public website has been established since the first month of the CHARTER lifetime. The website <u>http://www.charter-arctic.org</u> is the main tool for continuous project visibility and project information (Figure 2). The CHARTER website is of crucial importance in communicating the project idea and results. Therefore, the project has put special emphasis in developing the site to give a coherent and understandable picture of the project. The website operates in English. Basic information of CHARTER is made available also in Finnish, Swedish, Sami, Russian and German with an option of other languages such as Nenets, in a format that is easy to print and distribute as a factsheet with key messages.

The website also has video interviews of WP leaders and selected researchers, and videos and photos that help illustrate the project's aims and activities. Project partners are contributing to web contents, thus increasing the diversity of the site. Lack of physical meetings during the pandemic underlined the need for a well-functioning and comprehensible web content. CHARTER web contents follow the guidance of the EU Accessibility Directive. The project website also serves as a gateway to a private (password protected) collaboration platform for the consortium partners.







Figure 2: The frontpage of the CHARTER webpage

Social media: CHARTER's X (twitter) account @CharterArctic is active during the project (Figure 3). The account is operated by the Project coordination team at the Arctic Centre. Retweets by Arctic Centre and other project partners will enhance and facilitate spread of the messages. The partners will use the #CHARTERArctic hashtag when tweeting about their own project related activities. CHARTER has also used an Instagram account (Figure 3): https://www.instagram.com/arctic charter/. Other social media channels are not seen as necessary for the project. When a YouTube channel is needed, the project can use Arctic Centre channel and, when necessary and possible, those of the partner institutes. When it comes to Facebook, partner institutions are advised to use their own accounts when necessary. The project also aims to utilize Facebook pages and groups of project collaborators when possible; this way the message goes to targeted groups using a local language. CHARTER researchers are sharing information also through their personal webpages, ResearchGate etc.







Figure 3: CHARTER social media





Scientific Publications, Press Releases, Newsletters and Other Publications: All partners are responsible for publishing project results in the local and international press and in EC communication channels (e.g. Horizon the EU Research and Innovation Magazine.), when opportunities emerge. These publications could also be in the form of papers in scientific journals and conferences, press releases or newsletters in magazines and newspapers, etc.

Table 3 presents a preliminary list of the scientific journals and other platforms where project's research results are considered to be published. Open Access to scientific publications is a general obligation in Horizon 2020. More about Open Access and open data policy in the CHARTER Data Management plan.

Publications	Publication / platform type
Political Geography	Scientific journal
Land Degradation and Society	Scientific journal
Environmental Research letters	Scientific journal
Global Ecology and Biogeography	Scientific journal
Global Change Biology	Scientific journal
Journal of Biogeography	Scientific journal
One Earth	Scientific journal
Nature Sustainability	Scientific journal
PNAS	Scientific journal
Polar Research	Scientific journal
Environmental & Science Policy	Scientific journal
Arctic Anthropology	Scientific journal
Arctic	Scientific journal
Ambio	Scientific journal
Environmental Evidence	Scientific journal
Remote sensing	Scientifi journal
Cryosphere	Scientific journal
Siberian times	Regional magazine

Table 3: List of the scientific journals and other platforms where project's research results are considered to be published (about publications: see the Appendix)





High North News	Regional magazine
Guardian	Global magazine
Arctic portals	Internet platform
Arctic geopolitical blogs	Internet platform
Kide	University magazine

Participation in conferences, workshops and events is considered essential for obtaining "feedback" on the acceptance of the project results by both academic and local communities, and policy makers. Table 4 presents a list of conferences/workshops which are planned to be attended by the partners for disseminating project related information, or to be partly or fully organized by CHARTER. Detailed information about these foreseen dissemination activities are included in the PEDR available at the Annex of this deliverable.

The global COVID-19 pandemic affected both the possibilities of CHARTER researchers to travel and participate, and also the events organized. Flexibility is necessary. New on-line tools and working methods are being constantly developed and put to use. Virtual participation and also organizing virtual seminars, workshops and meetings have already been learned during the first months of CHARTER.

Table 4: List of conferences/workshops which are planned to be attended by the partners for disseminating project related information. (About dissemination activities: see the Appendix)

CONFERENCE/WORKSHOP/EXHIBITION	Year
United Nations Climate Change Conference COP26	2021
Rovaniemi Arctic Spirit	2021 and 2023
EGU European Geosciences Union	Annually
-Scientific sessions	
-Interdisciplinary session on communication	
AGU American Geophysical Union	Annually
ASSW Arctic Science Summit Week	Annually
Arctic Frontiers	Annually
Nordic Society Oikos conference	2022
INQUA International Union for Quaternary Research	2023
ICOP International Conference on Permafrost	2024





CHARTER has joined the **EU Polar Cluster**, a collaboration of Arctic and Antarctic projects funded by the European Commission. The benefits, as listed below at the EU Polar Cluster website, relate very much to project communication and visibility:

- Higher impacts than single project's outputs
- Upscale collective projects' efforts
- Increased knowledge sharing
- Less but better engagement with stakeholders
- Greater visibility
- Better use of citizen's money

Joining the EU Polar Cluster brings a direct way to access relevant EU communication channels and wider Arctic research communication channels. Cluster partners including CHARTER will be trained on how to disseminate the project outcomes professionally towards e.g. decision-makers or other stakeholders. The cluster also has a number of common communication and visibility actions that can benefit CHARTER. The contact point for EU Polar Cluster communication activities is the Arctic Centre's communications specialist.

Collaboration within EU Polar Cluster has proven fruitful. Joint events and policy briefs have been – and are being – prepared with other Horizon -funded projects ECOTIP and FACE-IT (two other biodiversity projects); and with ArcticHubs and JUSTNORTH (projects also concentrating on northern land-use). Discussions have also opened with another large project, Arctic PASSION, which also aims at some citizen science developments, opening locally relevant databanks, and co-creation certain local communities (learn more: https://ecotip-arctic.eu/; with https://www.face-it-project.eu/: https://projects.luke.fi/arctichubs/; https:// justnorth.eu/; https://arcticpassion.eu/)

In March 2023 CHARTER organized a policy event in Brussels with fellow Horizon2020 funded projects that focus on Arctic biodiversity: FACE-IT and ECOTIP. The science communication products by the three projects were also previewed. Besides connecting with policymakers in Brussels, collaboration with these projects was a very fruitful exercise, as many similar goals and challenges are shared. Another policy event will be organized together in autumn 2024.

Projects in the EU Polar Cluster tend to be natural science oriented. In contrast, CHARTER has a wider variety of approaches and much emphasis on people living in the Arctic. From the communication point of view, this gives CHARTER a chance to





have a different and easily recognizable profile from most of the projects in the cluster.

The Arktikum Science Centre has an important role in CHARTER dissemination. The LAY Arctic Centre operates the Arktikum Science Centre, the only Arctic science centre in Finland and on this scale, the only one in the EU. During recent years, the exhibition has been visited by 110 000 – 130 000 visitors annually, about half of them from countries other than Finland. The COVID 19 pandemic dramatically reduced the number of visitors, but tourism in the region is on the mend. The role of the Science Centre is to support the research consortium in tasks related to outreach and communication towards the general public and towards the local population concerned by the project outcome. The details of the role of the Science Centre are given in the CHARTER communication plan. The goal is to design and create relevant communication tools to:

- promote the project relevance and progress to the general public;
- demonstrate the local and global meaningfulness of the project outputs to the population of concern;
- make the main results understandable for non-scientific audiences.

2. 6. Evaluating the impact

The dissemination activities will be monitored regularly and reported annually, as well as a part of the CHARTER reporting. The metrics used are listed below.

CHARTER is required to follow and report the number of following dissemination and communication activities:

- Organisation of a Conference
- Organisation of a Workshop
- Press release
- Non-scientific and non-peer-reviewed publication (popularised publication)
- Exhibition
- Flyer
- Training
- Social Media
- Website
- Communication Campaign (e.g. Radio, TV)
- Participation to a Conference
- Participation to a Workshop





- Participation to an Event other than a Conference or a Workshop
- Video/Film
- Brokerage Event
- Pitch Event
- Trade Fair
- Participation in activities organised jointly with other EU project(s)
- Other

The number of persons reached by all dissemination and communication activities, in each of the following categories, should also be estimated:

- Scientific Community (Higher education, Research),
- Industry,
- Civil Society (World Reindeer Herders Association),
- General Public,
- Policy Makers (Arctic Council, ministries, land-use regulatory institutions and organisations dealing with conservancy and environmental protection),
- Media,
- Investors,
- Customers,
- Other. *Local landusers can be classified as under Industry/ Civil Society/ General Public.

Out of the listing above CHARTER has informed the EC that the following groups are not applicable for project impact assessment: Industry, Investors and Customers.

CHARTER will also follow:

- Number of papers published in international refereed journals.
- Number of papers/presentations in international conferences/ workshops/ forums
- Type and size of the target audiences addressed through the performed dissemination activities
- Geographic coverage of the performed dissemination activities
- Website statistics





3. Summary and evaluation of the impact achieved from the performed dissemination activities

Summary of the dissemination activities

CHARTER prepared and published its half-way assessment of project impact in November 2022. This section updates the information until project month 36. The dissemination activities have been summarized and the impact evaluated also in the 36-month periodic reporting, and will be evaluated again in the final reporting of the project.

At the time of the 36-month review of the project, the CHARTER website has had 24231 visitors to the website since its inception. The provenance of the majority of visitors are from Finland, Norway, the U.S., Germany, the UK, Sweden, Belgium and Canada. On the X platform (formerly Twitter), CHARTER has 489 X followers. The University of Lapland Arctic Centre account has over 9000 followers. CHARTER has also started publishing ESRI StoryMaps and has published one on a 'rain on snow' event in northwest Russia, and another on impact of climate change on palsa mires in northwest Finland. Combined these products have had over 300 views across multiple countries. CHARTER newsletters have been issued regularly since November 2021. The newsletter is also linked to EU Polar Cluster Communication Task Group activities. Visual material produced has been used during the reporting period, and the visual appearance of the project, designed during the first reporting period, has been important.

CHARTER had a representative in each of the EU Polar Cluster Task Groups and participated actively especially into the work of the Stakeholder, Education and Communication Task Groups, until these task groups were discontinued. After this, CHARTER has been part of sub-groups working towards shared policy events and policy briefs (together with ECOTIP and FACE-IT projects, and in another sub-group, with JUSTNORTH and Arctic Hubs).

The CHARTER StoryMap titled 'When the Rains Fell in Winter' (<u>http://bit.ly/tokcha</u>) was accepted to be showcased at the prestigious ESRI annual in person and virtual conference in San Diego, July 2023. This conference attracts 18,000 in person attendees and 20,000 watching online.

While research related media releases often tend to gain a limited reach, CHARTER can showcase also another example. In September 5th, 2023, Arctic Centre has a press release about vegetation damages in Finnish Lapland, caused by a forest moth





(butterfly species): <u>https://www.arcticcentre.org/news/Metsamittariperhosen-massaesiintyma-Ounastunturilla-/39646/74fd1f6e-b172-4352-87b2-774f4f39c1e8</u>. Sari Stark, who also leads CHARTER WP2, and Henri Wallén, who partly works also in CHARTER WP2, have been following this development in Finnish Lapland and commented the situation in media. This news went through in all major Finnish media, including a leading national newspaper Helsingin Sanomat (Figure 7), a leading evening newspaper Ilta-Sanomat, the national broadcast company YLE and the national news agency STT, with combined viewing number of over 10 million. Some other examples of media resonance were discussed also in the half-way impact -report.

The interactive interface on CHARTER themes is almost ready, and will be integrated into exhibition stations of the Arktikum (Arctic Science Centre) as well as being distributed through different media in multiple formats. The interfaces are digital, thus easily portable across the internet, with offline access also possible. The interface will include some of the information derived from CHARTER project research as well as its main outcomes and has a broad focus on the impact of "rain on snow" events on plants, animals and people. The work is under the responsibility of the science communicator supported by the exhibition team and exhibition design service providers, who have gathered the information, data and results from CHARTER researchers and partners as well by participating in fieldwork and workshops related activities. The interface content has been curated in a popularized manner for non-specialists. The Arktikum Science Centre receives over 100,000 visitors per year. The CHARTER derived exhibit is centered on three elements in two languages, Finnish and English.

Since the beginning of the project CHARTER researchers have submitted over 60 manuscripts to peer-reviewed journals. In addition to scientific publications, CHARTER has published for example working papers and has been active in many other forms of dissemination and early activities related to the exploitation of CHARTER results. The most prevalent types of activities are diverse meetings in professional networks. Another prevalent activity is participation in and presenting at conferences and events.

Through the completed dissemination activities, CHARTER has reached both policy makers and the scientific community and participated in public discussion at relevant fora. CHARTER impact on policy-makers stems currently mainly from researcher participation in policy related working groups, such as writing IPCC assessments. The possibilities of CHARTER partners to "engage critically to ongoing policy debates" varies. In Nordic countries, the environmental legislation and legislation guiding





reindeer husbandry are under development, and commenting the policy documents and participating working groups supporting the decision making is possible (more below). CHARTER has also published policy briefs as part of dissemination activities, and more are planned.

To update the information given above, CHARTER-linked papers published in peer reviewed journals and dissemination activities (1.8.2020 – 31.7.2023) are listed in the Appendix.

CHARTER impact

What comes to assessing CHARTER impact, only some estimation of the status of our impact metrics can be given, so far.

We hope that our climatic analyses will improve local preparation and adaptation to harmful weather events, and we think this will be enhanced by interaction with key stakeholders. The number of workshops/focus group meetings with stakeholders was given as a metric to follow this impact. So far, at least 16 workshops with reindeer herders, northern municipalities, students and administrators of northern livelihoods have been arranged (mostly in Finland, but also in Sweden and in Norway).

Our aim is that our biogeoengineering scenarios and paleological databases will give a better understanding on biodiversity drivers and feedbacks to CHARTER stakeholders, and for example broaden the "overgrazing" narrative, when it comes to reindeer husbandry. Here we gave a number of contributions to international/intergovernmental reports like IPCC, SDG or Arctic Council, as a metric. So far it is difficult to estimate this impact, also as the continuation of Arctic Council assessment work is uncertain.

We hope to have an impact on local and regional land-use planning through our landuse management scenarios and participatory work; we want to reorient prevailing land-use management narratives to one that encompasses climate and biodiversity feedbacks and participatory approaches. The number of reproductions in public reports and policy documents of CHARTER's published scenarios was given as a metric. As the scenarios (pathway narratives) are just being prepared, this impact cannot yet be evaluated.

Linked to the above, we aim that our narratives for maintaining biodiversity and ensuring the continuation of local Arctic livelihoods can offer clear policy options, and we will have possibility to participate in ongoing policy processes at various levels. In





Finland, a CHARTER-affiliated researcher was part of a working group called "The future of reindeer husbandry", chaired by the Ministry of Forestry and Agriculture, listing livelihood-specific policy recommendations. In Norway, the Supreme Court decided on the case of the construction of wind power turbines on the Fosen peninsula in October 2021, and found them to be illegal. The decision was historical, because it was the first time that affected Sami parties in a case concerning a development project in their traditional areas, won in the Supreme Court through a reference to human rights. A report by a CHARTER-affiliated NINA researcher was central in the rulings of the Court of Appeal and the Supreme court. Still, the metrics of this impact, "number of examples CHARTER outputs used in public debates, planning processes, etc." and "number of management plans of protected areas influenced by CHARTER" are still too premature to evaluate.

As CHARTER research produces results the first aim is to publish papers for the scientific community, followed closely by attendance at conferences and other events to further disseminate the newest results. The end goal is to produce results that can be exploited by the local communities, and to provide policy options for decision makers.

The target (outcome) table of CHARTER is shown in the form of tables 5 ("The expected impact of CHARTER) and 6 ("Measures to maximize impact").





Table 5: The expected impact of CHARTER; related activities and expertise of the consortium

Expected impact	Related activities and expertise within CHARTER
Implementation of	The EU policy for the Arctic presents three main policy objectives: (1)
Ell policy for the	environmental impacts and climate change: (2) Promoting sustainable use of
Arctic	resources and economic development together with people living in the
AICH	Arctic and (3) Enhancing international cooperation through engagement and
	dialogue with Arctic states indigenous neonles and other nartners CHARTER
	will contribute to all three objectives.
	Under Point (1), an urgent policy gap is that our "understanding of the Arctic
	systems, their functions and possible responses to various drivers are still
	largely unknown". The data synthesis and modelling components of
	CHARTER are geared to address this gap. The second policy gap is "Climate
	mitigation and adaptation strategies". CHARTER's modelling outputs and
	participatory workshops will focus on rendering climate mitigation
	strategies, such as increasing surface albedo at regional scales, into
	practical actions directly involving indigenous populations and local
	communities . The third aim is <i>"Protecting the environment"</i> . CHARTER will
	make strong contributions to filling this gap via development of clear
	metrics for maintaining Arctic biodiversity. CHARTER further addresses
	the environmental impacts of climate change, as requested by the EU. For
	point (2) above, CHARTER's planned work with pastoralists is very relevant
	to sustainable use of rangelands, and to economic development of people
	living in the study regions. By advancing the understanding of now changes
	In winter climate interact with numan land use in influencing key blodiversity
	elements for local residents, it will contribute to make informed decisions
	about conservation priorities for the future. For point (5) CHARTER will contribute via participatory workshape with Arctic regidents, administratory
	and scientists to jointly develop adaptation strategies
	The integrated FII Arctic policy contains 39 actions to further develop the
	FII's policy towards the Arctic By involving a large number of international
	northers and emphasizing the collaboration with indigenous neonles
	CHARTER will provide relevant contributions to: (1) The willingness of the
	FIL to work together with Arctic states their local communities and
	indigenous groups as well as with relevant international fora to develop an
	ambitions gloups, as well as with relevant international for a to develop an
	ambitious climate adaptation agenda for the Arctic region; and (2) The
	continued engagement of the EU with Arctic indigenous peoples and local
	communities to ensure that their rights are respected and their views are
	reflected in the ongoing development of EU policies.





IPCC **IPCC** assessments CHARTER consortium members actively contribute to and other major assessments, and other global and regional initiatives. LAY is serving as regional and global CA for IPCC-AR6's Special Report Ocean and Cryosphere (SROCC) Polar initiatives Regions chapter. Further, it is CA for the NOAA's annual Arctic Report Card, as well as numerous Arctic Council assessments, e.g. Arctic Biodiversity Assessment, Arctic Biodiversity Trends, Arctic Climate Impact Assessment, Arctic Oil & Gas, Arctic Social Indicators, Snow, Water, Ice and Permafrost Assessment (SWIPA) and Arctic Resilience Report. AWI is CA to the IPCCAR6's Regional Atlas Chapter, Polar Regions. WSL is CA for IPCC SROCC chapter High Mountain Areas. UCL is CA for IPCC-AR6 chapter Polar Regions sections on Arctic sea ice and Arctic amplification. LAY is CLA of Chapter 6 Impact analysis and consequences of change and CA for Chapter 9 Adaptation options in Adaptation Actions for a Changing Arctic (AACA): Perspectives from the Barents Area. CLA for Part 1 CA for Part 2 of the Red Book of Threatened Habitats in Finland 2018. As concerns the International Arctic Science Committee (IASC), UZH and WSL are the Swiss representatives in the IASC Terrestrial Working Group. UZH is also the PI of the Arctic Biodiversity activities of IASC. The aim of the related Arctic Vegetation Archive (AVA) is a standardized Pan-Arctic data base of existing plot vegetation data, following nomenclature of the Pan-Arctic species list, for monitoring biodiversity and analysis of biodiversity and ecosystem functioning. AWI is vice-chair in IASC's Atmospheric Working Group. UHAM and B-GEOS are respective members of IASC's Social and Human Sciences and Cryosphere Working Groups. CHARTER consortium members actively contribute to the Circumpolar Biodiversity Monitoring Programme (CBMP): AU is a member of the CBMP Terrestrial Invertebrates Expert Network, and Arctic UiT is a member of the CBMP Terrestrial Mammal Expert Network and was a LA in the Arctic Biodiversity Assessment. CAFF is implementing: (a) the CBMP and is also working to implement its terrestrial and freshwater monitoring plans via INTERACT; and (b) recommendations of the Arctic Biodiversity Assessment (ABA) ABA). CBMP is currently assembling data about status and trends of arctic terrestrial biodiversity and highlighting the inconsistent use of indigenous knowledge. UHEL is a member of Arctic Monitoring and Assessment Program (AMAP) and SWIPA Climate Change Assessment. It is also a member of the scientific delegation of Finland in the Arctic Ministerial Forum of the EU. UOXF is a LA on Arctic ecosystem services in The Economics of Ecosystems and Biodiversity Scoping Study for the Arctic. LAY is co-lead of the UArctic Thematic Network Arctic Extractive Industries. UHAM is founding member of the "Permafrost and Culture" Working Group of IPA. UiT leads, and NINA is partner on, the Climate Ecological Observatory for Arctic Tundra (COAT), a monitoring initiative for Norwegian tundra ecosystems under the effect of climate change, and the terrestrial flagship of the Fram Centre for climate and the environment in Tromsø. UiT is also a PI of an initiative parallel to COAT in West Siberia on long-term dynamics of vertebrate tundra food webs. NINA has a leading role in the The Svalbard Integrated Observation System (SIOS) and contributes to the annual Arctic Report Card. FMI is a member of the ESA Snow Climate Change Initiative, responsible for global/hemispheric snow-water equivalent monitoring





	continuing the GLOBSNOW work (including arctic and sub-arctic areas), as well as in World Meteorological Organization's Global Cryosphere Watch. Sodankylä and Saariselkä are FMI's reference sites for NASA SMAP and ESA SMOS satellite missions focusing on soil moisture and soil frost monitoring applications. AWI is cluster speaker and PI of the German Transregional Collaborative Research Centre on Arctic Amplification: Climate Relevant Atmospheric and Surface Processes, and Feedback Mechanisms (AC)3, a Year of Polar Prediction YOPP endorsed project, and co-coordinator of the modelling activities for the international project MOSAiC (Multidisciplinary drifting Observatory for the Study of Arctic Climate). UCL leads a sea ice/snow remote sensing study during MOSAiC and contributed to the EU PolarNet white papers on the most pressing issues in Polar Regions. It is a member of the Mission Advisory Group for a newly planned ESA satellite (STEROID). EDU and AU, respectively, are the founders and leaders of the ShrubHub and Herbivory Networks. AU leads the Network for Arthropods of the Tundra.
Enhanced	Co-production of knowledge among researchers and local
engagement of and	communities/indigenous societies is a cornerstone of CHARTER
interaction with	project. Local land users, indigenous organisations and communities will be
and indianous	contacted early on, to identify topical concerns that should be included on the project's research agenda. Exchanges discussions and interpretation of
unu inuigenous societies	project's research agenua. Exchanges, discussions and interpretation of findings will take place in participatory research activities with stakeholder
SUCIELIES.	mungs will take place in participatory research activities, with stakenoider workshops eliciting diverse (and possibly divergent) views on environmental
	change prospects for resource use and socially responsible strategies. The
	research approach in CHARTER is transdiscinlinary, acknowledging the
	value not only of expert knowledge but also local/indigenous ways of
	knowing and knowledge co-production in an iterative process of shared
	learning . Among local communities, CHARTER will lead to: (a) instrumental
	impacts for better formulation of evidence-based policies, such as the UN's
	Sustainable Development Goals; (b) conceptual impacts contributing to the
	understanding of the various SESs, the multiple aspects of global and local
	environmental change, including ROS impacts in tundra areas; and (c)
	capacity-building and skills development, such as the development of
	citizenbased tools for monitoring and maintaining Arctic biodiversity and
	climaterelated feedbacks, such as surface albedo and shrub encroachment
	into tundra areas. Project members will seek to ensure that communities will
	take project data as relevant, applicable and testable under local conditions.
	The CHARTER partners have strong existing networks in the study regions,
	but these will be further enhanced by reaching out to additional stakeholders.
	There is enough expertise within the CHARTER consortium to ensure the
	successful integration and engagement of local communities. LAY has signed
	support letters regarding CHARTER's objectives from partnering indigenous
	and local community representatives, including the Director of the
	Association of Finnish Reindeer Herding Districts, the Vice-President of the
	World Reindeer Herders Association and the Deputy Governor of the
	YamalNenets Autonomous District, West Siberia. The latter officially





	recognizes the strong value of EU-Russian scientific collaboration. Together, LAY, UHAM, UiT and NINA have 75+ person years of expertise on partnerships with indigenous pastoralists in Fennoscandia (Sami) and Arctic Russia (Nenets, Komi, Sakha). One of UHAM team members previously led stakeholder involvement in two EU-funded Barents Region research projects (TUNDRA, SPICE). LAY works closely with the fishermen and hunters of Sakha Republic (Yakutia) on their oral histories of the Lena Delta Nature Park. UZH is closely involved with nature conservation management with indigenous people, local communities and the Ministry of Environment in Sakha. The Kytalyk nature reserve there is currently applying for UNESCO status. NMBU collaborates closely with herders in Finnmark and Mongolia to integrate indigenous knowledge with meteorological information and predictive models of climate change. In West Siberia Arctic UiT is now closely collaborating with social anthropologists who have a large network of relations and excellent knowledge of the culture and language of nomadic tundra Nenets herders. UTU has strong expertise in participatory methods with local stakeholders in relation to land cover and land use changes and landscape management and planning.
Support the EU Polar Research Cluster (EU- PolarNet)	The EU-PolarNet is a network of Horizon2020- and FP7-financed projects that collaborate with the aim to provide guidance and policy relevant information for climate change adaptation and sustainable development in the Arctic. The CHARTER consortium is well incorporated into the EUPolarNet. This collaboration will allow us to contribute to achieve the objectives of the Polar Cluster, especially through the integration of new knowledge and improving innovation capacity. LAY has established contacts with the newly-funded EU Polar Research Cluster project KEPLER to engage indigenous stakeholder communities in Finland, Sweden and Russia. LAY is a project member of Arctic Cluster project BLUE-ACTION. B-GEOS is involved in two WPs of Arctic Cluster project NUNATARYUK: (1) Terrestrial Permafrost; and (2) Infrastructure. Regarding remote sensing, NUNATARYUK focuses on vegetation and coastal erosion along the Beaufort Sea coast. Infrastructure/settlement stability is mapped at the circumpolar level, but only within a buffer zone along the coast. UZH supports the Arctic Cluster through research station in Sakha Republic, Russia, which is an official station of INTERACT. It is one the main PI's doing long-term projects at the station, including regular monitoring by drones, biodiversity assessment, contributions to the Circumpolar Active Layer Monitoring (CALM) network. The FMI Space and Earth Observation Centre, Sodankylä, Finland is a key partner in iCUPE, INTAROS and INTERACT. New information and knowledge generated by CHARTER will enhance mitigative and adaptive capacity, strengthen resilience and reduce vulnerabilities of societies living





Supporting the EC	CHARTER is aligned with the European Commission's bioeconomy
bioeconomy	strategy and action plan (EC 2012, 2018) that aims to reconcile the use of
strategy	renewable biological resources with biodiversity and environmental
	protection . It also reflects the bioeconomic strategies of several national governments (e.g. Norway, Finland, Sweden and Russia) for sustainable food, fodder, and energy production (e.g. Regjeringen 2016). Through its innovative tools (like scenarios and policy pathways) CHARTER will provide valuable input to best management processes that can create innovation and competitiveness via closer cooperation of policymakers and stakeholders (EC 2012). CHARTER will thus reduce what the EC identifies as an important barrier to achieving a viable bioeconomy, namely that research is often disconnected from its application due to information and knowledge gaps, or institutional and conceptual barriers between researchers, producers, policy-makers and society at large. CHARTER bridges this gap and surmounts conceptual barriers by incorporating local approaches to sustainability and integrating them in management practices and policy options. Moreover, this research design will contribute to current strategic priorities for Research,
	Science, and Innovation (EC 2015): a bioeconomic approach can foster innovation via collaboration among stakeholders (researchers, local land users, managers). CHARTER fundamentally envisages close collaboration between stakeholders and the generation of cooperative knowledge. Our
	research transcends disciplines and borders, furthering open science.
	Chinese groups in search of global solutions to the global challenges of
	hindiversity loss and adaptation to climate change
Cumporting the FII	D CEOC in Vienne serves as the science lead of the European Cross Agency
space policy	(ESA) Climate Change Initiative Permafrost. It also functions as Permafrost community representative to the World Meteorological Organization (WMO) Polar Space Task Group, which coordinates satellite data acquisitions in the Arctic among the various global space agencies. We would also like to highlight that CHARTER has major remote sensing and PGIS components and an extremely high level of expertise in scaling between ground/sea-level cryospheric phenomena and processes and space-based platforms and
	European Space Agency initiatives, thus ensuring that CHARTER outputs will feed directly into the space-relevant components of EU Arctic policies.
Contributing to the IPBES work	Partners NMBU and WSL are involved in high level international intergovernmental advisory bodies like IPBES and IPCC. The IPBES 2030 work programme includes "communicating and engaging" as one of its six objectives to strengthen the involvement of the members and stakeholders and to increase the visibility of IPBES and the use of IPBES products. In line with these objectives, CHARTER's stakeholder engagement will be used to complement IPBES communications activities to raise awareness, catalyse





knowledge generation, support capacity-building and inform policymaking in the public and private sectors as well as in civil society. From the perspective of wild species, IPBES considers various approaches to the enhancement of the sustainability of the use of wild species and to strengthen related practices, measures, capacities and tools for their conservation through such use, taking into account the multiple worldviews and knowledge systems that operate within different socio-ecological contexts. CHARTER's research complements IPBES approach by being solution- oriented, with the overall aim of identifying challenges and opportunities to establish or strengthen measures and conditions that ensure and promote
the sustainable use of wild species.

CHARTER does not specifically target markets or seek business innovations through the results of the project. In our case, exploitation of results is very closely connected to the communicating and disseminating of these results. The summary table below provides concrete examples of pathways of CHARTER results for dissemination and exploitation. This details our current vision for how PEDR will steer the CHARTER consortium to reach the widest possible range of stakeholders and end-users, and how to engage them in order to make the broadest possible use of our results.

CHARTER results	Expected impact	Potential stakeholders and end-users	Measures to increase result exploitation	Metric of impact
Analyses of climate past, present-day and future, icing and snow processes likelihood maps of rain-on- snow events	Improved preparation for and adaptation to extreme weather events (e.g. ROS) in the short-term (1-10 yrs) and climate change in the longer term (decadal), contribution to SDG 13 (Climate Action)	Indigenous and local Arctic communities; Decision makers; Administrators/Rei ndeer governance institutions; Policy makers; Scientists; General public	Simulation and model visualizations with infographics and key data, participatory workshops with local residents, regional administrators and local to regional policy makers.	Number of workshops/focus group meetings with stakeholders

Table 6: Measures to maximize impact in CHARTER





Biogeo engineering scenarios	Improved framing of biodiversity drivers and feedbacks in contrasting SES contexts; Better understanding of longterm (centennial) development of land-use via paleoecological data. Contribution to SDG15 (Life on Land) and SDG13 (Climate Action)	General public; Indigenous and local Arctic communities; Decision makers; policy makers, Scientists, Administrators/Rei ndeer governance institutions;	Broadening of the current focus on 'overgrazing' of reindeer rangelands to encompass IPCC, SDG and other regional to global level narratives surrounding climate/biodiversity feedbacks.	Number of contributions to international/int ergovernmental reports (IPCC/SDG/Arctic Council)
Land-use manageme nt scenarios	Improved local and regional land-use maps and models Achieve sustainable development goals: Local innovation and improved adaptation to extreme weather events (sub-decadal) and climate change (decadal). Contribute and advance SDG11 (Sustainable Communities) and SDG15 (Life on Land).	Local and indigenous populations, Policy makers, General public, Companies leasing land in pasture areas for renewable & nonrenewable resourceuse	Shift the prevailing landuse management narrative to one that encompasses climate and biodiversity feedbacks and participatory approaches	Number of policy briefs and white papers Number of dissemination activities on land- use scenarios?
Narratives and codesign for maintaining biodiversity and ensuring livelihoods	Creating narratives and pathways based on model and observational data that can offer policy options, as well as act as a dissemination tools for the public. Participation in ongoing policy processes through our Expert Advisory Group, e.g. ministerial working group "Future of reindeer husbandry in Finland", 2020-2021. Drafting roadmaps; how to ensure both ecological and sociocultural sustainability of livelihoods in the Arctic while maintaining biodiversity	Indigenous and local Arctic communities; Decision makers; Administrators; Policy makers; Scientists; General public	Engage critically ongoing policy debates. Target debates to do with livelihoods: These include for example reindeer herding (e.g. herding limits and numbers), infrastructure development (windpower parks, train line in N NorwaySweden /Finland, mining), and forestry (reindeer herding limit, use of forests in bioeconomy) debates. Leverage the consortium's links to administrators and policy makers to maximize reach.	CHARTER media report (e.g. Meltwater reports if available) Number of dissemination activities directed towards target groups Attendance at the meetings with reindeer herders and number of meetings. Also meetings and attendance with local authorities e.g. Länsstyrelsen in Sweden.





4. CHARTER exploitation plan

Research and innovation have been placed at the centre of the Europe 2020 strategy to promote smart, sustainable and inclusive growth. While one can debate what constitutes a healthy relation of industry and basic research, there is no doubt that a knowledge-based society prospers with the innovativeness of its engineers and the skills of its scientists. It is emphasized that "research is an investment in our future and so put it at the heart of the EU's blueprint for smart, sustainable and inclusive growth and jobs". In the Horizon 2020 funding program, EC puts a focus on closely linking basic research and application.

Impact in this context is the extent of the benefits derived from the innovation (economic impact, academic impact, societal impact and the impact on environment). While academic impact can be addressed by suitable dissemination and communication activities, other impacts require exploitation measures.

4.1. Objectives of exploitation

Overall objectives of the exploitation plan are fostering exploitation of CHARTER research results by ensuring contacts to stakeholders, collecting needs & requirements, identifying challenges for implementation, summarizing impact, and to developing the exploitation plan and the exploitation strategy.

Exploitation and dissemination measures should address potential end-users and uses of the results that will be generated. An aim for CHARTER is the future exploitation of project results, such as data and modelling tools.

CHARTER does not target markets or seek business innovations through the results of the project. For CHARTER the relevant measures could include for example research activities and policy making. Results generated under the project will be tangible or intangible output, more particularly data, knowledge or information.

4.2. Methodology

Important exploitation approaches and tools typically evolve from proposal to the end of the project and often comprise (Kurz & Jung-Waclik, 2017):

• A target outcomes table describes the features of the method / material / product / service that are the outcome of the project.





- A Stakeholder Matrix or equivalent has become the standard tool for giving a comprehensive picture of the community of researchers, potential users and influencers in an application field. On top, this information is the basis for defining target groups in dissemination and communication planning
- A Needs and Requirements analysis

The CHARTER research comprises of transdisciplinary work in various work packages and with local Arctic communities and policy makers. Research is based on state-of-the-art methodology and some parts include high-risk high-gain approach. The scientific results will be high-level and widely applicable. The exact results cannot be known yet; the key messages as well as detailed exploitation measures will be developed along the way. The CHARTER strategic exploitation plan and strategy continuously evolves throughout the project, based on the following selected steps:

- 1. Identification of the CHARTER exploitation target groups
- 2. Needs of stakeholders and collaborators
- 3. Summaries of project outcomes
- 4. Feedback by target groups (outside perspective, including EAG)

6. Plan for the exploitation after CHARTER: funding schemes, other application areas, collaboration with other projects, data storing and sharing etc.

Input from various stakeholder groups and users of the results are gathered as a part of the scientific work in CHARTER; the participatory research methods and coproduction of knowledge serves as a tool to discuss and develop the exploitation measures and end-products. The main activities for the development of the exploitation strategy comprise:

- Interviews with different stakeholder groups in person or via phone/internet.
- Organization of and participation in workshops.
- Attending conferences.
- Identification of further research areas and promising developments in Arctic policy making etc.
- Policy briefs and Short notes aimed at decision makers highlighting relevant results for policy

The EAG and project partners help establish contacts to experts and stakeholders.





4.3. Tools for and approaches to exploitation

In addition to dissemination activities (Appendix), also exploitation activities will be summarized and their potential impact evaluated, in the final reporting of the project (see section 4.5). The template of this is given below.

CHARTER aims to focus exploitation efforts especially towards policy makers, and local people, such as reindeer herders. The narrower scope is pertinent considering expected results. In table 5 the expected results and target groups are identified. Table 6 goes more into detail on the strategy on how to reach the wanted impact.

4.3.1. The CHARTER (target) outcome table

In CHARTER, the target outcomes and results differ greatly from the more technical/business-oriented projects. The CHARTER research comprises of transdisciplinary work in various work packages and with local Arctic communities and policy makers. The scientific results will be high-level and widely applicable; the key messages as well as detailed exploitation measures will be developed along the way. Generally, all CHARTER results are expected to fall under one of the two wide cross-cutting themes "Tools and data for Arctic Strategies", and "Public dialogue on the Arctic". Some examples of the expected results are (see also Table 6):

- CHARTER will create a unique data-based synthesis informed by stakeholder perspectives of 21st century Arctic change. The policy options pursued will be driven by co-production of knowledge with local communities, simultaneously accounting for global shifts, including climate change.
- The holistic simulations will be used as the basis for iterative dialogue with land users during data collection, processing and synthesis. The resulting simulations and pathways are testable and relevant at local scale and may be directly incorporated into existing locally-derived adaptation plans. Stakeholders at individual, community and administrative levels are genuinely involved during all research phases (e.g. development, execution, interpretation, dissemination).
- The state-of-the-art in biodiversity conservation theorizes biodiversity management as a public good based on the inclusion of different ways of knowing (e.g. scientific, indigenous and local knowledge) in order to ensure relevance, legitimacy and credibility. EU initiatives reflect this approach in theory but have seldom achieved it in practice.





- CHARTER will showcase and serve as a model for what decision makers can actually achieve for future climate and biodiversity adaptation and mitigation elsewhere on the planet, by properly integrating successful and sustainable reindeer management practices that affect vast and potentially sensitive Arctic rangelands.
- **CHARTER will strive to be at the cutting edge of the new revolution in paleoecology**. The aim is to use large datasets and new analytical tools to understand how biodiversity has changed in the past, how conservation efforts need to take long historical trajectories into account and identify thresholds and tipping points of ecological systems.
- CHARTER will provide empirical evidence of how concerns about biodiversity protection, and climate change mitigation and adaptation, can be integrated across knowledge systems and spatial scales.

CHARTER will identify throughout its duration the relevant policy networks and policy communities involved in the EU policy for the Arctic and engage directly with them to make our findings available. The drafting of this new policy was initiated in July 2020 with the launching of a public consultation on maritime affairs and fisheries that clearly emphasized the fundamental role of "a better understanding of the developments the region is facing, and for this reason the EU is a major contributor to Arctic research." (See https://ec.europa.eu/info/law/better-regulation/haveyoursay/initiatives/12523-EU-Arctic-Policy/public-consultation) Moreover, this process also indicates that the " understanding of the Arctic systems, their functions and possible responses to various drivers are still largely unknown" underscoring the need for the type of knowledge that CHARTER will produce. We aim to engage directly with this and other similar policy making processes, either through public consultations, through the EU PolarNet initiative, and/or the Arctic Council. In our periodic evaluation of the PEDR we will monitor this engagement and its impact through metrics of number of meetings/dialogues with the relevant networks and of representation in relevant public consultations, as well as number of references to CHARTER finding in public and policy documents.

We will elaborate our narrative pathways (Deliverable 6.4) in close collaboration and dialogue with end-users and stakeholders. CHARTER holds the co-production of knowledge as a central principle of the project design and will involve local people in all stages of the research (including the initial problem definition). Throughout the project our research partners will be involved through focus group discussion where our preliminary results will be discussed- either by individual categories of stakeholders (e.g. local reindeer herders) or by several categories in dialogue (herders and local administration). This approach will allow us to make sure our





research has local relevance and impact as well as contribute corroborating evidence for how impact has been achieved.

CHARTER will design ways to **maximize impacts by following policy-making opportunities** as they arise during project period. Some examples: Finnish, Swedish and Norwegian Arctic Strategies are being updated. At the end of the project period we will conduct an evaluation of the impacts of our science-policy dialogue which take place during the project period (Deliverable 7.15). This evaluation will be based on qualitative interviews with policy- and decision-makers in the regions investigated about their knowledge of CHARTER's research results/findings and combine this with a Social Network Analysis to trace how findings are communicated from person to person until they reach the policy or not. This would allow a significant methodological innovation as well as an objective evaluation of how impacts can be maximized at the science-policy interface.

CHARTER will produce a series of policy-briefs and a policy report summarizing and integrating the CHARTER findings regarding the interlinkages between biodiversity, climate change, and sustainable development in the Arctic. We will align our 'summary-for-policy-makers' report with the elaboration of central policy documents. We will actively engage with these processes and offer to provide policyready versions of our results if they can be included in (and cited as tracing back to CHARTER) in these strategy documents. We will evaluate our impact on these processes by trying to establish an evidence trail that can show how our workshops, policy-briefs, policy report, and other results will be used in the elaboration of these policies. This science-policy engagement can also be documented in an open-access peer-reviewed article (for example in the journals 'Political geography' or 'Land degradation and society') that can provide methodological innovation for other researchers interested in improving their policy impacts. A CHARTER working papers series has been established. By having the working papers visible and available publicly on the website they also represent outreach tools: https://www.charterarctic.org/charter-scientific-publications/#working-papers.

As mentioned, CHARTER has joined the EU Polar Cluster, a collaboration of Arctic and Antarctic projects funded by the European Commission. This should benefit CHARTER as a higher impact than single project's outputs. EU Polar Cluster utilizes Horizon Results Booster action that will help to strengthen the capacity of the cluster as a whole in exploiting our research results, and the Catalyst-platform: https://polarcatalyst.eu/.





4.3.2. Stakeholders

The CHARTER dissemination target groups are described in chapter 2.3. The exploitation target groups, a subset of the dissemination target groups, will be regularly specified in greater detail during the project, the process also involving local Arctic communities and livelihoods. Geographical focus lies in Northern Europe. Nevertheless, important international players are considered as well.

4.4. Plan for the exploitation after CHARTER (Future Roadmap)

Section 4.4 and 4.5 outline a strategic plan for the further use of CHARTER results; it outlines the premises for the further use of results and IP generated, and for liaising with other initiatives to maximize impact. The content for this section has been produced by the CHARTER Coordination team; consortium researchers contributing through discussions and workshops in CHARTER third GA in October 2023. Also, the findings from the 18-month impact assessment were used when preparing this section. This section has been arranged around two wide cross-cutting themes of CHARTER: "Tools and data for Arctic Strategies", and "Public dialogue on the Arctic".

Tools and data for Arctic Strategies

Looking into the future after the CHARTER project is ended, we expect that main results and contribution of the project will be the scientific publications, and the data collected during the project. Sharing and storing data collected during the project is an important part of our dissemination and exploitation and will lay foundation for efficient further use of CHARTER results. The updated Data Management Plan (DMP, Deliverable D7.18) describes in detail the exact procedures for data processing, sharing and storing within the CHARTER project.

The DMP is developed to guide the Consortium in managing data quality and protection issues that will arise along the project life. The plan identifies the type of data that will be generated by the project team, as well as the standards that will be used to ensure their quality and scientific relevance, whilst avoiding data overproduction. As well, the DMP guides the collection, storage, transfer, protection and anonymisation of data during the project lifetime and beyond the end of the project, and provides a clear description of procedures for safe and ready-formatted transfer and long-term preservation of the datasets. The DMP addresses ethical guidelines for publishing open access digitally recorded and visual materials from project participants, whilst observing the principles of data protection (General Data Protection Regulation, GDPR) and open access to data generated by the project.





CHARTER has started to use the Zenodo -platform to store and share the data and results: <u>https://zenodo.org/communities/charter?page=1&size=20</u>

The tools and data will be exploited through scientific community and research organizations and networks; results will be background for new research developments, and further research areas can be defined because of CHARTER work. In 2023, three biodiversity projects (CHARTER, ECOTIP and FACE-IT) have been preparing their joint views about research prioritization in Arctic science.

Public dialogue on the Arctic

CHARTER work has potential to be used in developing Arctic policies and decision making, and in land use planning in Arctic.

CHARTER has already reached both policy - makers and the scientific community and participated in public discussion at relevant fora. CHARTER impact on policy-makers stems currently mainly from researcher participation in policy related working groups, such as writing IPCC assessments. The possibilities of CHARTER partners to "engage critically to ongoing policy debates" varies. In Nordic countries, the environmental legislation and legislation guiding reindeer husbandry are under development, and commenting the policy documents and participating working groups supporting the decision making is possible.

Close collaboration with national – and some collaboration with Nordic - Saami institutes offers potential to impact, now when several level climate roadmaps and adaptation plans are being prepared. CHARTER has carried out participatory research with many northern local and Indigenous communities and other land-users. CHARTER researchers have also organized a number of workshops as part of their research.

4.5. Exploitation activities

Overall project impacts will be assessed by metrics shown in the table 6, while the exploitation goals and related activities are outlined in Table 7. In addition to dissemination activities, the exploitation activities performed and planned will be collected for the final meeting and final reporting of the project, (see also the section 4.3.1 about "target outcomes").





According the CHARTER Grant agreement, the Executive Agency for Small and Medium-sized Enterprises (EASME) the Commission may carry out interim and final evaluations of the impact of the action measured against the objective of the EU programme. Evaluations may be started during implementation of the action and up to five years after the payment of the balance. The evaluation is considered to start on the date of the formal notification to the coordinator or beneficiaries. The Agency or the Commission may make these evaluations directly (using its own staff) or indirectly (using external bodies or persons it has authorised to do so). The coordinator or beneficiaries must provide any information relevant to evaluate the impact of the action, including information in electronic format.

CHARTER exploitation goals and related activities will be analyzed for the final reporting and final meeting of the project, using the following data:

Concrete activity; Partner and WP; Time and forum; Target group (scientific community/research networks/research organizations; decision-makers [which level]; local communities [where]; other); General aim of the action (future collaborative research projects; future research development; developing Arctic policies and decision making; impacting the land-use planning in Arctic; contributing to strategic initiatives; other); Way to monitor after the project period [if applicable]

Exploitation goals	Related activities within CHARTER (some examples)	
CHARTER will create a unique data-based synthesis informed by stakeholder perspectives of 21st century Arctic change. The policy options pursued will be driven by co-production of knowledge with local communities, simultaneously accounting for global shifts, including climate change.	CHARTER research has contributed to, and formed a number of narratives about change in the Arctic: E.g. the narrative of the Arctic as a cultural landscape. Specific contributions include work from WP2, such as the review D2.1. Another narrative is that all climate change impacts should be considered in socio- political-cultural context, i.e. find how impacts are meaningful to human activity. Other narratives are likely to rise from work done by WP3, such as addressing the fragmentation of pastures, stakeholder groups need for opportunities to participate in governance, reindeer herding beyond "meat and production", understanding vulnerability traps (years with difficult weather, and bad economy) and land-use encroachment and conservation -question.	
The holistic simulations will be used as the basis for iterative	This goal will be addressed for example by the completion of D6.3 ("Examination of Arctic land use and biodiversity management practices	

Table 7. Exploitation goals ("target outcomes") and related activities within CHARTER.





dialogue with land users during data collection, processing and synthesis. The resulting simulations and pathways are testable and relevant at local scale and may be directly incorporated into existing locally-derived adaptation plans. Stakeholders at individual, community and administrative levels are genuinely involved during all research phases (e.g. development, execution, interpretation, dissemination).	 including local livelihoods") and D6.4 ("Co-design of policy options to inform climate adaptation and mitigation policies and practices and enhance the viability and resilience of Arctic local livelihoods") CHARTER WP5 will also endeavor to develop modelling presentations for local needs and about "critical events" in changing climate. For this goal we need to reference WP5 work on translations between climate modelling and local knowledge and local relevance. The challenges with exploitation of management models hinges on some models being limited to the Arctic. A big question to solve is how to make model results relevant to communities at local scales? Some solutions can be found in producing content such as maps and narratives for herders and the general public.
CHARTER will showcase and serve as a model for what decision makers can actually achieve for future climate and biodiversity adaptation and mitigation elsewhere on the planet, by properly integrating successful and sustainable reindeer management practices that affect vast and potentially sensitive Arctic rangelands.	The successful completion and dissemination of D6.4 ("Co-design of policy options to inform climate adaptation and mitigation policies and practices and enhance the viability and resilience of Arctic local livelihoods") will be key to achieving this goal.
CHARTER will strive to be at the cutting edge of the new revolution in paleoecology. The aim is to use large datasets and new analytical tools to understand how biodiversity has changed in the past, how conservation efforts need to take long historical trajectories into account and identify thresholds and tipping points of ecological systems.	CHARTER WP4 deliverables 4.1 Systematic map, 4.2 Holocene arctic biodiversity database and 4.3 Cryosphere database, combine large datasets, to show long term trajectories in climate change and biodiversity. To make used tools available and to secure continued funding for the databases are important goals for exploitation of these results. All this data is saved in Zenodo, and will be available for future research.
The state-of-the-art in biodiversity conservation theorizes biodiversity management as a public good based on the inclusion of different ways of knowing (e.g. scientific, indigenous and local knowledge) in	CHARTER aims to reach this goal by producing deliverables and publications based on collaborative work such as workshops. By producing results based on inclusion of different ways of knowing CHARTER ensures the relevance, legitimacy and credibility of its biodiversity management related results and policy options.





order to ensure relevance, legitimacy and credibility.	
CHARTER will provide empirical evidence of how concerns about biodiversity protection, and climate change mitigation and adaptation, can be integrated across knowledge systems and spatial scales.	The successful completion of multi-disciplinary deliverables and publications showcases that concerns about biodiversity protection, and climate change mitigation and adaptation, can be integrated across knowledge systems and spatial scales.

5. Knowledge management and protection of IPR

The management of the research data generated and/or collected during the project, such as details on what types of data the project will generate, whether and how this data will be exploited or made accessible for verification and re-use is described in the CHARTER Data Management Plan.

Effectively exploiting research results depends on the proper management of intellectual property, which will be part of the overall management of knowledge in the project. Due to the novelty research aimed to be realized within the CHARTER project, the necessary measures are required to be applied towards protecting the legitimate interests of the involved parties with respect to the background introduced to the project and the foreground developed. To this end, special focus will be placed on ensuring appropriate knowledge management and protection.

Before the project started, in order to properly manage the intellectual property and results generated in the course of the project as well as pre-existing IP, a Consortium Agreement was signed by all partners. This is an essential action in order to guarantee an efficient and protected sharing of information, as well as to ensure the smooth running of the project. The general principles that were stated in the definitive Consortium Agreement cared to appropriately distinguish and manage background and foreground knowledge, ownership and access, dissemination and sharing of the results. The main issues addressed are the following:

- Confidentiality among institutions involved in the project, as well as confidentiality policy towards external institutions;
- Access rights to the background on a royalty-free basis; any legal restrictions or limits should be announced





- Ownership and licensing of future results, taking into account pre-existing IP and each partner's contribution to the production of new or emergent IP;
- Access rights to the future results on a royalty-free basis limited to noncommercial and non-competitive use.
- The possibility of joint ownership of resources and results for future exploitation;
- Transfer of knowledge and results to those industrial partners interested in exploiting CHARTER results as well as to third parties.
- All personal data should be removed from shared background, results and other information.

To ensure a smooth implementation of CHARTER, all project partners have already determined any Background IP they will submit to the project within the Consortium Agreement. Any details concerning the access rights to Background and Foreground IP for the duration of the project have also been defined in the Consortium Agreement.

Furthermore, a process has been established and defined ensuring that prior notice of any planned publication is given to the other project partners before the publication. Any objection to the planned publication shall be made in accordance with the Consortium Agreement in writing to the Coordinator and to the Party or Parties proposing the dissemination after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted. It is worth noting that at all times, care will be taken in order to ensure that knowledge protection rules and requirements stated within the [CA] and [GA] are fully respected. A Party shall not include in any dissemination activity another Party's Results or Background without obtaining the owning Party's prior written approval, unless they are already published.

Foreseen exploitation activities will be at all times communicated internally with the use of the CHARTER PEDR, although these are managed in greater detail by the corresponding departments of each partner organization. This ensures that the consortium will be aware of the interests of each partner and to any sensitive information related to the research activities.





6. Conclusions

The current document presents and analyses the CHARTER Plan for the exploitation and dissemination of project results of all CHARTER partners. As the planned activities of each individual partner are shared within the consortium, the task of protecting IPR and planning communication strategies becomes more effective and close monitoring of the implementation of the plan is made possible.

In that sense, the current document is expected to act as a point of reference for current and foreseen dissemination and exploitation activities. The CHARTER Dissemination and Exploitation Plan will be regularly monitored and updated throughout the project lifetime, and information will be added according to the performed and planned dissemination and exploitation activities.

This report is the second PEDR release and describes the stage of the dissemination and exploitation plan in October 2023 (project month 39). It outlines the intended actions as to disseminating the results of the project as well as the exploitation plan.

The number and type of dissemination and exploitation activities performed and/or intended to be performed by the CHARTER partners are considered to be sufficient. Finally, the involvement of all partners in the implementation of the dissemination and exploitation activities is considered to be adequate.

Useful Resources

Horizon Results Platform – Making results matter! -video: <u>https://www.youtube.com/watch?time_continue=21&v=NOTc5quDJXo&feature=e_mb_title</u>

Fact sheet on "IP Management in Horizon 2020: project proposal": <u>http://www.iprhelpdesk.eu/Fact-Sheet-IP-Management-H2020-Proposal-Stage</u>

Fact sheet on "How to manage IP in Horizon 2020: grant preparation stage": <u>http://www.iprhelpdesk.eu/Fact-Sheet-IP-Management-H2020-Grant-</u> <u>PreparationStage</u>





Fact sheet on "How to manage IP in Horizon 2020: project implementation and conclusion": <u>http://www.iprhelpdesk.eu/Fact-Sheet-IP-Management-H2020Project-Implementation-and-Conclusion</u>

The Horizon 2020 Guidelines on Open Access to scientific publications and research data:

http://ec.europa.eu/research/participants/data/ref/h2020/grants manual/hi/oa pilot/h2020-hi-oa-pilot-guide en.pdf http://www.iprhelpdesk.eu/FS Open Access to publications and data in H2020FAQs

The European IPR Helpdesk aims at raising awareness of Intellectual Property (IP) and Intellectual Property Rights (IPR) by providing information, direct advice and training on IP and IPR matters to current and potential participants of EU funded projects. In addition, the European IPR Helpdesk provides IP support to EU SMEs negotiating or concluding transnational partnership agreements, especially through the Enterprise Europe Network. All services provided are free of charge.

Helpline: The Helpline service answers your IP queries within three working days. Please contact us via registration on our website – www.iprhelpdesk.eu – phone or fax.

Website: On our website you can find extensive information and helpful documents on different aspects of IPR and IP management, especially with regard to specific IP questions in the context of EU funded programmes.

Newsletter and Bulletin: Keep track of the latest news on IP and read expert articles and case studies by subscribing to our email newsletter and Bulletin.

Training: We have designed a training catalogue consisting of nine different modules. If you are interested in planning a session with us, simply send us an email at <u>training@iprhelpdesk.eu</u>.





Appendix

Publications

Papers acknowledging CHARTER and published in peer-reviewed journals until August 2023. In addition, several recent manuscripts are in review.

Akperov, M., Wenxin Zhang, Paul A Miller, Igor I Mokhov, Vladimir A Semenov, Heidrun Matthes, Benjamin Smith and Annette Rinke. 2021. Responses of Arctic cyclones to biogeophysical feedbacks under future warming scenarios in a regional Earth system model. Environmental Research Letters, Volume 16, Number 6

Barrio, I.C., Barbero-Palacios, L., Kaarlejarvi, E. et al. What are the effects of herbivore diversity on tundra ecosystems? A systematic review protocol. Environ Evid 11, 1 (2022). https://doi.org/10.1186/s13750-022-00257-z

Bartsch, A., G. Pointner, I. Nitze, A. Efimova, D. Jakober, S. Ley, E. Hogstrom, G. Grosse, P. Schweitzer (2021): Expanding infrastructure and growing anthropogenic impacts along Arctic coasts. Environmental Research Letters. https://doi.org/10.1088/1748-9326/ac3176

Bartsch, A., Bergstedt, H., Pointner, G., Muri, X., Rautiainen, K., Leppanen, L., Joly, K., Sokolov, A., Orekhov, P., Ehrich, D., and Soininen, E. M. (2023): Towards long-term records of rain-on-snow events across the Arctic from satellite data, The Cryosphere, 17, 889–915, https://doi.org/10.5194/tc-17-889-2023.

Bartsch, A., Strozzi, T., and Nitze, I.: Permafrost Monitoring from Space, Surveys in Geophysics, 2023. https://link.springer.com/article/10.1007/s10712-023-09770-3

Castano C, Hallin S, Egelkraut D, Lindahl B, Olofsson J, Clemmensen KE 2023 Contrasting plantsoilmicrobial feedbacks stabilize vegetation types and uncouple topsoil C and N stocks across a subarticalpine landscape. New Phytologist 238:2621-2633

Doering, N., Dudeck, S., Elverum, S., Fisher, C., Henriksen, J.E., Herrmann, T., Kramvig, B., Laptander, R., Milton, J., Omma, E.M., Saxinger, G., Scheepstra, A.J.M. & Wilson, K. 2022. Improving the relationships between Indigenous rights holders and researchers in the Arctic: An invitation for change in funding and collaboration. Environmental Research Letters, 17 (6): 065014. DOI 10.1088/1748-9326/ac72b5

Erlandsson, R., Bjerke, J.W., Finne, E.A., Myneni R.B., Piao, S., Wang, X., Virtanen, T., Rasanen, A., Kumpula, T., Kolari, T.H.M., Tahvanainen, T., Tommervik, H. 2022. An artificial intelligence approach to remotely assess pale lichen biomass. Remote Sensing of Environment 280 (2022) 113201. https://doi.org/10.1016/j.rse.2022.113201

Forbes, B. C., Kumpula, T., Meschtyb, N., Laptander, R., Macias-Fauria, M., Zetterberg, P., Verdonen,





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Dissemination activities

A non-exhaustive list of CHARTER dissemination activities until August 2023. For example, social media activities not listed here. Classified according to the type of activity (activity; partner; time; target audience; certain categories combined). The list will be updated for the final reporting.

Invited presentations, lectures etc.

- Satellite based monitoring of industrial development across the Arctic; ASSW/ IASC; University Tromso; BGEOS; 29.3.2022; Scientific Community (Higher education, Research)
- Status and Drivers of the Arctic Surface Energy Budget; Zurich meets Seoul festival; Seoul, South Korea; UZH; 2.10.2019
- Klimawandel im hohen Norden Russlands: Wie Rentierhirten die Veränderungen in der Tundra beschreiben; "Ringvorlesung Osteuropastudien an der Universität Hamburg, Wintersemester 2021/22; "Zwischen Umweltzerstörung und ländlicher Idylle: Osteuropa in ökologischer Perspektive""; ONLINE (Universität Hamburg), Hamburg, Germany; UHAM; 12.01.2022; Scientific community (higher education)
- Ethics and perspectives on working with local communities; PolarRes Early Career Scientists Bootcamp; H2020 PolarRes project; Søminestationen, Denmark; AWI; July 3, 2023; early career researchers

Organization of a session / panel

- Reindeer herding: between nature and culture, between the past and the future; XV (Fifteenth) Congress of Anthropologists and Ethnologists of Russia; Association of Anthropologists and Ethnologists of Russia; Sankt-Peterburg, Russia; UHAM; June 26-30, 2023; Scientific Community; Russia and Fennoscandia
- Arctic Land Surface Energy Fluxes and Their Impact on the Earth System Under Current and Future Conditions; AGU, San Francisco, US; UZH; 10.12.2019; Scientific Community; Global

Organisation of a workshop





- Systematic review on the effects of herbivore diversity on tundra ecosystems; Nordic Oikos Conference; Aarhus, Denmark; LBHI; 6 June 2022; Scientific community; Nordic countries
- Systematic review on the effects of herbivore diversity on the functioning of tundra ecosystems; Herbivory Network meeting; online; LBHI; 16 Nov 2021; Scientific community; Circumpolar
- Co-Creation of Knowledges and Collaborative Research: Decolonial Methodologies in the Arctic and beyond; The conference of the German Anthropological Association on "Contested Knowledge: Anthropological Perspectives"; Ludwig-Maximilians-Universität München, Germany; UHAM; 25-28.07.2023; Scientific community (research); Arctic regions in general and Fennoscandia
- Workshop in the South Saami Reindeer Hub Plaassja in Rossen tjïelte (Røros), and fieldtrip to Synnervika and Grådalen; Røros, Norway; NINA; 15.-16.8.2023; Reindeer herders, County governor officers; Norway
- Impact of supplementary feeding on reindeer health and the environment; Arvidsjaur; NINA, UmU, LAY; 7-9.06.2022; Reindeer herders; Fennoscandia

Conference presentations

- Contribution to UNFCCC Panel on early waring at Earth Day; UNFCCC; Sharm el Sheik, Egypt; BGEOS; 9.11.2022; General public/academics/students; Global
- Seasonal and inter-annual landcover dynamics in selected drained lake basins on Yamal, Siberia; AGU, Chicago, USA; BGEOS; 18.12.2022; science community; global
- Rain-on-Snow monitoring across the Arctic with satellite data; ASSW, Vienna, Austria; BGEOS; 21.2.2023; science community; global
- Rain-on-Snow monitoring across the Arctic with satellite data; Finnish satellite workshop; Espoo, Finland; BGEOS; 19.1.2023; science community; Finland
- Rain-on-Snow monitoring across the Arctic with satellite data; EGU, Vienna, Austria; BGEOS; 19.4.2023; science community; global
- Drained Lake Basins in lowland permafrost regions; IPA; Puicgerda, Spain; BGEOS; 19.6.2023; science community; global
- FACTORS INFLUENCING LATE-HOLOCENE VEGETATION DYNAMICS AND BIODIVERSITY ON HALLANDS VÄDERÖ, SW SWEDEN: A STATISTICAL EVALUATION; Rome, Italy; INQUA International Union for Quaternary Research (2023); UNILIV; 15 July 2023; Scientific Community; Global
- Sami Forest Landscapes; Arjeplog; UmU; 16-17.06.2022; Reindeer herders and researchers.
- Parameters matter: improving soil and air temperature representation in an Arctic RCM using improved vegetation and soil boundary parameters; CESM Land Model and Biogeochemistry Working Group Annual Meeting; Center for Atmospheric Research, Boulder, USA (online meeting); AWI; 2.2.2022; Scientific Community; global
- A mammoth comeback? Can large herbivores dominate ecosystem functions? Neotoma Palaeoecology Database, Web-based; UNILIV; 28.4.2021; Palaeoecological researchers; Global
- The use of palaeoecology in restoration ecology; Ecological Societies of America and Canada; Montreal, Canada; UNILIV; 17.8.2022; Ecologists; North America (including Canada)
- Status and Drivers of the Arctic Surface Energy Fluxes at Pan-Arctic Scale a Synthesis; AGU, Virtual meeting; UZH; 16.12.2020; scientific community
- The causes and consequences of biodiversity change in the warming Arctic, Swedish Oikos Society, Gothenburg, Sweden; UEDIN; 1 Feb 2023; scientific community (research); Fennoscandia/Sweden





- Long-term management history affects seasonal diet composition of semi-domesticated reindeer; Norwegian Barcode of Life (NorBOL); BIOSCAN NOReDNA Conference; Trondheim, Norway; NTNU; 09-10.11.2022; Scientific community; International
- Long-term management history affects seasonal diet composition of semi-domesticated reindeer; International Conference on DNA Barcoding and Biodiversity (ICDBB) ; Bulgarian Academy of Sciences; Sofia, Bulgaria; NTNU; 25-27.05.2022; Scientific community; International
- Snow pits by citizens; Cryosphere 2022, Reykjavik, Iceland; LAY, FMI; 25.8.2022; Scientific community; Global
- Snow pits by citizens ideas, plans and ways forward; 10th National Seminar on Snow, Online; LAY, FMI, 2.2.2022, Scientific community, Finland
- Arctic rain on snow events, when rain falls in winter; North American Caribou Workshop and Arctic Ungulate Conference, Anchorage, Alaska; UHAM; 9.5.2023; Scientific community, Traditional knowledge holders, Arctic
- When Rains Fell in Winter; Online; LAY; 15.8.2023; Scientific community, Traditional knowledge holders, regional administrators; Norway
- Seasonal and inter-annual landcover dynamics in selected drained lake basins on Yamal, Siberia; Bonn, Germany; BGEOS; 20.5.2022; science community; global
- Indigenous people and their voice in the collaborative research with western researchers in the future; Participated in the discussions about the future of the Arctic research as a indigenous researcher. How to optimally share knowledge and best practice regarding adaptation and resilience; Arctic Horizon Scan 2022 organised by the Oxford University Polar Forum; Oxford University, Oxford, UK; UHAM; 06-09.09.2022; Scientific community; Arctic regions in general
- Traditional and contemporary environmental knowledge of snow, ice and permafrost among the Yamal Nenets. Presentation was about traditional and modern environmental knowledge of snow, ice and permafrost among the Yamal Nenets which later I developed as an article; Arctic Science Summit Week 2023 in Vienna, University of Vienna, Vienna, Austria; UHAM; 20-21.02.2023; Scientific community; Western Siberia (Yamal)
- <u>https://storymaps.arcgis.com/stories/b63ced1af26a435bbfd4a910c8fac488</u>; Presentation designed by Philip Burges about Stories and Maps of the 'serad po': Visualizing the Severe Icing Event of 2013/4 on the Yamal Peninsula; the Arctic Ungulate Conference, Anchorage. Alaska, USA; Anchorage, Alaska, USA; UHAM, LAY; 8-12.05.2023; Scientific community (research) and indigenous peoples of Alaska, Finland and Yamal; Arctic regions in general and Fennoscandia
- "Reindeer herding and language functioning: on the example of Komi language in the North of European Russia and in Western Siberia", "Reindeer Herding in the Russian Nord-West: main characteristics of the interaction between reindeer and people" (Both presentations were in Russian).; Real People in the 21 Century: Languages and Cultures of Arctic Aboriginal People; M. K. Amosov North-Eastern Federal University (Yakutsk, Russia) Anadyr, Chukchee Area, Russia; UHAM; October, 11-13, 2023; Scientific Community; North of the European Russia, Western Siberia.
- Reindeer herders of Vorkuta Tundras in the 21 century: social, cultural and administrative problems. (in Russian); 6th Arctic Lecturing Day "Komi Arctic as a Part of Arctic Cultural Heritage: Save, Enrich and Promote!"; Vorkuta City Administration, Vorkuta Library Network. Vorkuta, Komi Republic, Russia (remote participation); UHAM; April, 25, 2023; General Public; Vorkuta tundra
- "Did reindeer eat all the shrubs? Mimicking Arctic big grazers in CLM", CESM Land Model and Biogeochemistry Working Group Annual Meeting; National Center for Atmospheric Research, Boulder, USA (online participation); AWI; February 2, 2023; Scientific Community; international





- Using climate model projections to provide relevant climate information to Arctic reindeer herding communities"; EGU General Assembly 2023; European Geoscience Union; Vienna, Austria; AWI; April 24, 2023; Scientific Community; international
- Stakeholder involvement and participatory research: how do they work in practice? Examples from the circumpolar North; Methods and Ethics in Transformative Arctic Research; IASS (Institute for Advanced Sustainability Studies); ONLINE; Potsdam, Germany; UHAM; 25.09.2020; Scientific community
- What is it like to live with/without permafrost? Cattle, sheep, horses, reindeer and their herders in sub-polar and inner-Asian regions; ON MELTING GROUND: ARCTIC ARCHAEOLOGY (conference); Saxon State Museum for Archaeology (SMAC), Chemnitz, Germany; UHAM; 21.10.2021; Scientific community (research); Northwest Russia (Komi), Siberia (Central Yakutia/Sakha), Mongolia (Selenge)
- The Nenets religious norms of hunting for sea mammals in the Baydarata Bay, Yamal Peninsula; Session: Spirits of places, animals and persons: New religions for new needs; The 10th International Congress of Arctic Social Sciences (ICASS X); ONLINE (University of Arkhangelsk), Arkhangelsk, Russia; UHAM; 18.7.2021; Scientific community; Western Siberia (Yamal)
- Changing Cryospheres I: Global Warming in Polar and Alpine Settings, Climate change and coping with other rapid changes in the Yamal tundra; Vienna Anthropology Days (Vanda 2020); ONLINE (University of Vienna), Vienna, Austria; UHAM; 30.9.2020; Scientific community; Western Siberia (Yamal)
- Reindeer food names in Nenets language; Names of Lichen and other reindeer food in the Nenets language: hove to save them in the condition of the climate change; CIFU XIII Vienna University, Finno-Ugrian Studies; University of Vienna, Vienna, Austria; UHAM; 25.8.2022; Scientific community (linguists, researchers); Western Siberia (Yamal)
- Traditional and modern environmental knowledge of snow, ice and permafrost among the Yamal Nenets. <u>https://vanda.univie.ac.at/scientific-program/</u>; Anthropology Days (Vanda2022); University of Vienna, Vienna, Austria; UHAM; 26.09.2022; Scientific community; Western Siberia (Yamal)
- Zyrians in the tundra areas of Yamal: A minority among minorities [Зыряне в Ямальских тундрах: меньшинство среди меньшинства]; Contemporary people in the 21th century: Language and culture of the Indigenous peoples of the Arctic [Настоящие люди в XXI веке: язык и культура коренных народов Арктики] (Scientific conference); М. К. Amosov North-Eastern Federal University, Chukotka Branch; Anadyr, Chukchi Autonomous Okrug, Russia; UHAM; 11-12.10.2022; Scientific community; Yamalo-Nenets Autonomous Region, Russia
- Loops vs corridors: The ecological and economic purpose of two basic models of migration in the reindeer-herding area [«Круги» и «коридоры»: экологический и экономический смысл двух основных моделей миграций в ареале оленеводства самодийского типа]; XII Siberian Lectures: Resources of the Arctic and Siberia [XII Сибирские чтения: Ресурсы Арктики и Сибири техники, технологии, жизнеобеспечение] (Scientific conference); Peter the Great Museum of Anthropology and Ethnography, Russian Academy of Science (Kunstkamera); St. Petersburg, Russia; UHAM; 24.10.2022; Scientific community; Russia
- Investigating the Impacts of Rain on Snow Events on Snowpack Stratigraphy in Northern Finland; 23th NRB symposium; SMHI; Ammarnäs, Sweden; LAY, FMI; 24.8.2023; Scientific community; Global
- Drivers of dryness? Exploring the interaction of permafrost and land use in northern Mongolia; European Conference on Permafrost (EUCOP) 6; International Permafrost Association Puigcerdà,





Catalunya, Spain; UHAM; June 19, 2023; Scientific public (mainly natural scientists); Northwest Russia; Republic of Sakha (Yakutia); northern Mongolia

- Northern high-latitude permafrost and terrestrial carbon response to two solar geoengineering scenarios; Stratospheric Aerosol Injection; GeoMIP Workshop; Exeter, UK; LAY; 3.7.2023; Scientific community; International
- Synthesizing the role of herbivore diversity on tundra ecosystems. [poster presentation]; Nordic Oikos Conference; Aarhus, Denmark; LBHI, NTNU; 7-10 June 2022; Scientific communit; Nordic countries
- Introduction to the Arctic: A holistic way of looking to the Arctic region First Inter-Polar Conference; ICIMOD, Nepal; Kathmandu, Nepal; LAY; 6.9.2023; scientific community; International
- Providing relevant climate information to Arctic reindeer herding communities; Bjerkness Center, Bergen, Norway; Polar CORDEX annual meeting; AWI; 28.9.2022; Scientific Community; Polar CORDEX community (Europe, US, Asia, South America)
- PolarRes annual meeting; Bjerkness Center, Bergen, Norway; AWI; 26.-27.9.2022; Scientific Community; PolarRes partners (EU)
- Using Unmanned Aerial Systems to unveil the impacts of woody encroachment in subarctic tundra wetlands; ESA Living Planets Symposium; Bonn; UEF; 25.5.2022; Germany
- The thaw lakes and drained thaw lakes in the Yamal peninsula 1961 2018, impacts on land cover change and reindeer herding; ESA Living Planets Symposium; Bonn, Germany; UEF; 25.5.2022
- Arctic shrubification: Unveiling the role of reindeer husbandry as a Natured-based solution in tundra ecosystems; Ecosystem Services Partnership EU Conference; Heraklion, Greece; UEF; 14.10.2022; scientific community; EU
- Drivers of vertebrate trophic networks in terrestrial Arctic ecosystems; Vienna, Austria; ASSW; NTNU; February 2023; Scientific community; Global
- What motivates model developments? A multi-perspective case study from snow physics models; Vienna, Austria; EGU; UEDIN; April 2023; Scientific community; International
- Plant diversity dynamics across temporal and spatial scales in a warming Arctic; British Ecological Society Annual Meeting; Edinburgh, UK; UEDIN; December 2022; Scientific community; International
- Plant diversity dynamics across temporal and spatial scales in a warming Arctic; Oikos Sweden; Gothenburg, Sweden; UEDIN; January 2023; Scientific community; International
- Plant diversity dynamics over space and time in a warming Arctic; 52nd Annual Meeting of the Ecological Society of Germany, Austria and Switzerland Leipzig University, Germany; UEDIN; September 2023; Scientific community; International
- The Seventh International Symposium on Arctic Research (ISAR-7); Tokyo, Japan; NINA; March 2023; Scientific community; International
- Long-term management history affects seasonal diet composition of semi-domesticated reindeer; Amiens, France; Ecology and Dynamics of Human-influenced Systems Lab; NTNU; 17.06.2022; Scientific community; France
- Changing northern lands; ISSI Game Changer Seminar, invited contribution; ISSI Bern -online (<u>https://www.issibern.ch/game-changers-changing-northern-lands/</u>); BGEOS; 13.5.2022; General public/academics/students; Global

Workshop presentations





- Sustainable development pathways achieving Human well-being while safeguarding the climate And Planet Earth (SHAPE) Stakeholder workshop; Creative adaptation to wicked socio-environmental disruptions (WISE STN); Doctoral Programme in Geosciences; Helsus Doctoral programme; Helsinki, Finland; UH; 4-8.4.22; scientific community; Finland
- Virtual Symposium and Round Table: The past as a lens for biodiversity conservation on a dynamically changing planet; Helsus Doctoral programme; United States; UH; 2-3.12.21; scientific community; USA
- Sustainable development pathways achieving Human well-being while safeguarding the climate And Planet Earth (SHAPE) Stakeholder workshop; Helsus Doctoral programme; UH; 6.12.2021; scientific community; global
- Presentation about future-oriented CHARTER work, JUSTNORTH study visit "Promoting regional development in the Arctic"; Arktikum, Rovaniemi, Finland; LAY; 24.2.2023; Policy makers interested in Arctic issues; CHARTER-Arctic Hubs JUSTNORTH collaborators; EU
- What limits model developments? Investigating the decision-making process; Open Global Glacier Model (OGGM) annual workshop; Edinburgh, UK; UEDIN; August 2023; Scientific community; International
- Workshop on "Desirable futures in reindeer husbandry"; CHARTER-orgainzed workshop with herding communities in Jokkmokk: Sirges, Jåhkågaska tjellde, Tuorpon; Jokkmokk, Sweden; UmU; August 2023; reindeer herders; national (Sweden)
- Arctic plant ecology: an interdisciplinary science?; Durham University, UK; InterArctic Knowledges; UEDIN; May 2023; Interdisciplinary scientific community; National (UK)
- Klimaet i Norge nå og i framtiden effekter på vegetasjon og reinbeiter (Current and future climate: impacts on vegetation and reindeer pastures); Røros, Norway; NINA; 16.8.2023; Reindeer herders, County governor officers; Norway
- Variasjon i albedo og andre karakteristikker av vegetasjon i åpne og nordlige økosystemer: Rollen til lav og moser (Variation in albedo and other vegetation characteristics in non-forested northern ecosystems: the role of lichens and mosses); Røros, Norway; NINA; 16.8.2023; Reindeer herders, County governor officers; Norway
- Greening and browning in the Arctic and the boreal regions 1982-2022; Røros, Norway; NINA; 16.8.2023; Reindeer herders, County governor officers; Norway
- Insights from presented other regions: shifting seasons, artificial feeding, and prospects for the next generation of reindeer herders; Røros, Norway; UHAM; 15.8.2023; Reindeer herders, County governor officers; Norway
- Satellite-based mapping of winter grazing areas in Fæmund sijte, Sålekinna-Håmmålsfjellet and Korssjøen-Feragen-West; Røros, Norway; NINA; 15.8.2023; Reindeer herders, local farmers, local municipalities, County governor officers, Norwegian Environment Agency and the local National Park Femundsmarka. Wild Reindeer range personel; Norway
- When Rains Fell in Winter: a decade ago, heavy winter rains washed over the Yamal Peninsula (Russia), killing 60,000 reindeer and ruining livelihoods; Røros, Norway; LAY; 15.8.2023; Reindeer herders, County governor officers; Norway
- Arctic Terrestrial Processes; CLIVAR Arctic Processes in CMIP6 Bootcamp; Søminestationen, Denmark; AWI; 11.10.2022; PhD students, early PostDocs= Scientific Community; Europe
- Status and Drivers of the Arctic Surface Energy Fluxes at Pan-Arctic Scale a Synthesis Xth International Symposium on C/H2O/Energy balance and climate over boreal and arctic regions with special emphasis on eastern Eurasia; Sapporo, Japan; UZH; 4.10.2020; scientific community; global





Popular publications

- Toteutuivatko 20 vuotta sitten tehdyt ennusteet?; Poromies magazine; LAY, UH, UEF; 2022; Reindeer herders and reindeer husbandry adminstration; Finland
- Coping with a Warming Winter Climate in Arctic Russia: Patterns of Extreme Weather Affecting Nenets Reindeer Nomadism; In book: Resilience Through Knowledge Co-Production; ONLINE; UHAM; 2022; General public; Western Siberia (Yamal)
- What is it like to live with/without permafrost? Cattle, sheep, horses, reindeer and their herders in sub-polar and inner-Asian regions; On Melting Ground: Arctic Archaeology (collected volume); Saxon State Museum for Archaeology (SMAC), Chemnitz, Germany; UHAM; 26.10.2022; Scientific community; Northwest Russia (Komi), Siberia (Central Yakutia/Sakha), Mongolia (Selenge)
- "Permafrost e utilizzo autoctono del suolo negli Urali settentrionali: allevamento delle renne dei Komi e Nenets" [Permafrost and indigenous land use in the Northern Urals: Komi and Nenets reindeer herding]; Il Polo: rivista trimestrale dell'Istituto Geografico Polare "Silvio Zavatti", LXXV (2): 9-29.; Istituto Geografico Polare "Silvio Zavatti"; Fermo, Italy; UHAM; 01.10.2020; General public, mainly academia-related; Northwest Russia (Komi, Yamal, etc.)
- Eating Plants to Mitigate the Impacts of Climate Change on Tundra?; UArctic Shared Voices Magazine; <u>https://old.uarctic.org/shared-voices/shared-voices-magazine-2021/eating-plants-to-mitigate-the-impacts-of-climate-change-on-tundra/</u>; LBHI; 2021; General Public, Scientific community; Circumpolar
- Невидимые люди. 90 лет злоключений воркутинских ненцев-частников. <u>https://goarctic.ru/politics/nevidimye-lyudi-90-let-zloklyucheniy-vorkutinskikh-nentsev-chastnikov/;</u> Arctic Development Portal [Портал о развитии Арктики]; GoArctic.ru (News Portal); Arkhangelsk, Russia; UHAM; 06.12.2021; General Public; Vorkuta, Komi Republic, Russia
- Arctic roads and railways: social and environmental consequences of transport infrastructure in the circumpolar North https://cdnsciencepub.com/doi/full/10.1139/as-2021-0033; online publication in Canadian Science Publishing Volume 9, Number 2, June 2023; Arctic Science, ONLINE; UHAM; 2023; General public; Siberia
- The Yamal Nenets' traditional and contemporary environmental knowledge of snow, ice, and permafrost <u>https://ecologyandsociety.org/article-author/roza-laptander/;</u> Climate change and coping with other rapid changes in the Yamal tundra; Ecology and Society, ONLINE; UHAM; 2023; General public; Western Siberia (Yamal)
- On 'social benefits' in the windpower debate in Northern Norway (in Norwegian, "Om 'samfunnsgoder' i vindkraftdebatten i Nord-Norge') <u>https://www.nordnorskdebatt.no/om-</u> <u>samfunnsgoder-i-vindkraftdebatten-i-nord-norge/o/5-124-253550;</u> Nordnorsk Debatt/Nordlys Newspaper; Online/in print; NMBU; 4.7.2023; General public; Norway
- The Palsa Mire: Often Seen, Little Understood, Under Threat; StoryMap for online publication <u>https://storymaps.arcgis.com/stories/c09e93eb17da45ac9cc8257018b0995f</u>; Online; LAY; 8.7.2023; General Public, Scientific community, Civil Society; Global
- Laptander, R. 2022. Ngesiko' Laptander's Pi' sarma khnytabts.Helsinki: Helsingin yliopiston kirjasto, 2022, pp. 383-396. <u>https://helda.helsinki.fi/bitstream/handle/10138/342438/Osa%2032%20Laptander.pdf?sequence=5;</u> www.helda.fi (Helsinki University Digital Archive); Laboravaya, Yamal-Nenets Autonomous Okrug, Russia; ONLINE (University of Helsinki), Finland; UHAM; 2022; General public; Western Siberia (Yamal) Polar Ural Mountains





- The Nenets' Sacred Places: The singing mountain Yangana-Pe. <u>https://nome.unak.is/wordpress/volume-17-no-3-2022/long-abstract-editor-review/the-nenets-sacred-places-the-singing-mountain-yanganya-pe/;</u> Nordicum-Mediterraneum: Icelandic E-Journal of Nordic and Mediterranean Studies; ONLINE (University of Akureyri), Iceland; UHAM; 2022; General public; Western Siberia (Yamal) Polar Ural Mountains
- Promoting comprehensive sustainability in strategy work in the Arctic; <u>https://researchportal.helsinki.fi/en/organisations/helsinki-institute-of-sustainability-science-helsus;</u> UH; 2021; scientific community; Finland
- Kokonaiskestävyyden edistäminen arktisen alueen strategiatyössä, HELSUS; UH; 11 Oct 2021; scientific community; Finland
- CHARTER-hankkeen taustapaperi 1: Tietoa ja arktisia näkemyksiä ilmasto- ja ympäristölainsäädännön tueksi; UH, LAY; 30 Sep 2020; scientific community, decision makers; Finland
- CHARTER Working Paper 1: Knowledge and Arctic Perspectives to Support Climate and Environmental Legislation development; UH, LAY; 18 Dec 2020; scientific community, decision makers; Finland
- Impacts of reindeer grazing and local topography on plant and lichen communities across the reindeer fence along the Finnish-Norwegian border; master thesis; Helsinki, Finland; UH; 2021; scientific community; Finland
- CHARTER Towards a Broader Understanding of Arctic Complexity; Uarctic Shared Voices Magazine; LAY; 2021; general public; Circumpolar
- Mapping Arctic Research in Iceland; LBHI; 2020; scientific community; Iceland

Science communication (interviews, press releases, videos etc.)

- A popular-scientific exhibition "Facing Disaster"; Consultation for the exhibition, helping with the planning and scientific context for the exhibition; Heureka, Finland; UH; Period:23 Nov 2021 → Sep 2023; general public; Finland
- Haastattelu Keikahduspisteistä; Tekniikka ja Talous magazine; UH; 4.9.2020; General public; Finland
- Lumihiutale muuttaa muotoaan koko talven ajan; Maaseudun Tulevaisuus magazine, Finland; LAY; general public; Finland
- "Näkyykö ilmastonmuutos lumesta?" <u>https://areena.yle.fi/podcastit/1-65207706</u>"; Interview in Inari, Finland, YLE news piece; LAY; 28.3.2023; general audience; Finland
- Update on work in CHARTER; Open session of the Social and Human Sciences Working Group (SHWG) of the International Arctic Science Committee (IASC); Social and Human Sciences Working Group (SHWG) of the International Arctic Science Committee (IASC); ONLINE (Arctic Science Summit Week 2021), Lisbon, Portugal; UHAM; 20.03.2021; Scientific community; Fennoscandia, Northwest Russia
- When Rains Fell in Winter; Sharing the StoryMap at the exhibition gallery of the 2023; Esri User Conference, Online; LAY; 8.7.2023; Scientific community; Global
- Arctic Café: Maankäyttö, ilmastonmuutos, oikeudenmukaisuus Kolme pohjoiselle tärkeää Horisontti -hanketta esittäytyy; Rovaniemi, Finland; LAY; 25.11.2020; general public; Finland
- When Rains Fell in Winter; StoryMap for online publication; https://storymaps.arcgis.com/stories/b63ced1af26a435bbfd4a910c8fac488 and Arktikum Science





Centre exhibition; Online + Rovaniemi, Finland; LAY; 9.3.2023; General Public, Scientific community, Civil Society; Global

- Advancing the Adaptive Capacity of Arctic communities; <u>https://www.nmbu.no/en/faculty/landsam/department/noragric/news/node/40338</u>; NMBU; 12.5.2020; General public/academics/students; Global
- Kyselyllä selvitetään ympäristömuutoksia ja asukkaiden tulevaisuuden toiveita Savukosken seudulla ("Survey investigates perceived environmental changes and local people's future wishes in Savukoski region"); <u>https://www.epressi.com/tiedotteet/tiede-ja-tutkimus/kyselylla-selvitetaan-ymparistomuutoksia-ja-asukkaiden-tulevaisuuden-toiveita-savukosken-seudulla.html</u>; UTU; 4.2.2022; Residents and land users; general public and civil society; Northern Finland
- Vegetation regulates energy exchange in the Arctic; UZH; 31.10.2022; general public; global
- New film shows the dramatic effects of climate change for the entire lifestyle of Nenets people (BBC); <u>https://www.arcticcentre.org/EN/News/News?ln=x4ueznur&id=ff728f65-6777-4ae6-968f-f0ccca2dca81</u>; LAY; 20.1.2023; General public; International
- New book on reindeer husbandry and the environmental and societal challenges affecting pastoralist communities in Fennoscandia; https://www.arcticcentre.org/EN/News/News?ln=x4ueznur&id=da533f29-12f4-4256-94b7-ceb273e5a737; LAY; 21.4.2022; General public; International
- Metsämittariperhosen massaesiintymä Ounastunturilla; https://www.arcticcentre.org/FI/uutiset/uutinen?ln=mejgwgyc&id=74fd1f6e-b172-4352-87b2-774f4f39c1e8; LAY; 5.9.2023; General public; Finland
- Arktisen keskuksen ja ympäristöministeriön toimittajakurssi Inarissa; https://www.arcticcentre.org/FI/uutiset/uutinen?ln=mejgwgyc&id=0291765d-f3e3-4bbe-b7e2-31d93cd35a64; LAY; 1.3.2023; General public; Finland
- Tutkijoiden ja BBC:n yhteistyönä tehty filmi kertoo ilmastonmuutoksen dramaattisista vaikutuksista Nenetsien elämäntapaan ; <u>https://www.arcticcentre.org/FI/uutiset/uutinen?ln=mejgwgyc&id=ff728f65-6777-4ae6-968f-f0ccca2dca81</u>; LAY, UHAM; 20.1.2023; General public, Finland
- Tutkijat tiivistävät yhteistyötä kansalaishavainnot Saharan hiekkapölystä sekä lumesta ja jäästä kerätään yhteen tietokantaan; <u>https://www.arcticcentre.org/FI/uutiset/uutinen?ln=mejgwgyc&id=25996b19-08f9-40e7-a4d9-fa8db8020378</u>; LAY, FMI; 30.3.2022; General public; Finland
- Danger Muskox and Danger of Musk ox wool prices; <u>https://arcticanthropology.org/2023/05/19/danger-muskox-and-danger-of-muskoxen-wool-prices/?fbclid=IwAR3WlQurjqoSLZvMU2Xor9arbH-DUb8TUYGvILzT4me4NR1OFTSapSggb_Y;</u> Arctic Anthropology Updates and News from Northern Anthropologies of Circumpolar Regions; Arctic Anthropology Blog; UHAM; 19.5.2023; General public; Western Siberia (Yamal) Polar Ural Mountains
- Mobility in the tundra: how to use the old snowmobiles in the summer; <u>https://arcticanthropology.org/2021/09/15/mobility-in-the-tundra-how-to-use-the-old-snowmobiles-in-the-summer/</u>; Arctic Anthropology Updates and News from Northern Anthropologies of Circumpolar Regions; Arctic Anthropology Blog; UHAM; 15.9.202; General public; Western Siberia (Yamal) Polar Ural Mountains
- If Santa Claus' reindeer can fly, what about other reindeer? https://arcticanthropology.org/2022/06/20/if-santa-claus-reindeer-can-fly-what-about-other-reindeer/;





Arctic Anthropology Updates and News from Northern Anthropologies of Circumpolar Regions; Arctic Anthropology Blog; UHAM; 20.7.2022; General public; Western Siberia (Yamal)

- Reindeer and numbers: How reindeer-herding statistics come into being and work [Олени и цифры: как создаётся и работает статистика оленеводства]. https://goarctic.ru/work/oleni-i-tsifry-kak-sozdayetsya-i-rabotaet-statistika-olenevodstva/ Arctic Development Portal [Портал о развитии Арктики] <u>https://goarctic.ru</u>; ONLINE, Arkhangelsk, Russia; UHAM; 14.06.2022; General public; Northwest Russia (Kola, Komi, Yamal, etc.)
- Arctic Nomads, <u>https://www.youtube.com/watch?v=JMpVSzz1Fn0&t=21s;</u> "Arctic vibes"; Video series; Pora Foundation, youtube forecast; UHAM; 14.08.2021; General public; Russian Arctic
- YLE 5+1 sukupuuttoa (interview and news piece); Helsinki, Finland; UH; 24.8.2022; general public; Finland
- Tutkijoiden mukaan kuudes joukkosukupuutto etenee vauhdilla ja uhkaa koko ihmiskuntaa Lajikatoa on kuitenkin vielä mahdollista hidastaa; UH; 24.8.2022; general public; Finland
- Translation work of Interviews from Nenets to English collected from the Yamal Nenets talks about climate change and global warming in the Yamal Tundra (Domono production, Belgium); BBC Frozen Planet II; ONLINE; UHAM; 2020-2022; General public; Western Siberia (Yamal)
- Translation work of Interviews from Nenets to English collected from the Yamal Nenets talks about climate change and global warming in the Yamal Tundra; Translation work; UHAM; June-August 2022; General public; Western Siberia (Yamal)
- Is There Hope for Reindeer in a Warming Arctic? | Our Frozen Planet | BBC Earth; <u>https://www.youtube.com/watch?app=desktop&v=NyLt-</u> <u>m_UqUM&fbclid=IwAR31gp_SclsD6Yh9EjJWarx_EMGvD0EsXNY-</u> <u>GRnXCgrppVWbBaTBHqVH130</u>; Tundra Nenets-English translation work; ONLINE; UHAM; December 2022; General public; Western Siberia (Yamal) Polar Ural Mountains
- Hvordan kan reindrifta tilpasse seg klimaendringene? ("How can reindeer herding adapt to climate changes?"); <u>https://www.nmbu.no/aktuelt/node/42407;</u> NMBU; 4.2.2021; General public/academics/students; Norway/Scandinavia

Science-policy events

- Zur derzeitigen Situation in der sozialwissenschaftlichen Arktisforschung mit Bezug auf Russland; Arktis-Dialog Nr. 20; Arktisbüro Deutschland (Arctic Office Germany); Deutshce Gesellschaft für Auswärtige Politik, Berlin, Germany; UHAM; 29.11.2022; Policy Makers (ministries); Russia in general
- The Polar Alarm Bells are Ringing. Will the World Listen? Panel; Arctic Basecamp; World Economic Forum, Davos; UZH; 23.5.2022; Various stakeholders; Global
- EU Policy briefing; Arctic biodiversity, climate and food security policy briefing at European Commission; Brussels, Belgium; UZH; March 2023; Policy-makers (EU); International
- Shifting social-ecological systems and biodiversity in a warming Arctic; Arctic biodiversity, climate and food security policy briefing at European Commission; Brussels, Belgium; UEDIN; March 2023; Policy-makers (EU); International
- Savukosken seudulla havaittuja ympäristömuutoksia ja toiveita tulevaisuudelle CHARTERhankkeen käynnissä oleva kysely ("Perceived environmental changes and future wishes in Savukoski region - on-going survey of Charter project"); Town hall of Savukoski municipality; UTU; 6.4.2022; Residents and land users, municipal decision-makers; Savukoski, Finland





Training

- Revisiting the relationship between researchers and people in the tundra (a talk about working with tundra people and conducting interviews with them); PhD Course: Participatory Research in a Globalizing North (University of Lapland); University of Lapland, Rovaniemi, Finland; UHAM; 12.10.2021; PhD Students community (research); Europe; Western Siberia (Yamal)
- Training cource for journalists on Arctic biodiversity and land use; Finnish Ministry of Environment, Finnish Association of Science Journalists, Finnish Association of Environment Journalists; Inari, Finland; LAY; 13.-14.3.2023; Media; Finland
- Career pathways for drone pilots and technicians; Drones help ecologist to understand the impacts of climate change on the Arctic; Istituto Tecnico Commerciale "G. P. Chironi" Nuoro, Sardinia, Italy (part of an ERASMUS plus programme); AU; 24.9.2021; High school students; Italy
- Maantieteilijä arktisen alueen havaittuja ympäristömuutoksia tutkimassa ("Studying perceived environmental changes in the Arctic as a geographer"); Upper secondary school of Savukoski; UTU; 27.4.2022; High school students; Savukoski, Finland
- Imagining futures, negotiating futures and identifying local priorities for municipal development. We utilized Charter futures workshop methods with the students; Futures workshop in Salla High School, Finland; Salla, Finland; UTU, LAY; April 2023; High school students
- School visit to the School of Geosciences, University of Edinburgh; Careers in Arctic science; Edinburgh, UK; UEDIN; June 2022; School students, UK
- National community involvement for snow sampling; summer school presentation; Andenes, Norway; BGEOS; 20.9.2022; science community/ higher education; Global
- Lecture on community involvement in snow monitoring (material prepared by LAY); ESA Training Course on Arctic Methane and Permafrost 2022; Andoya Space centre, Norway; BGEOS, LAY; 22.9.2022; university students and post-docs; Global