# PHUSICOS

## According to nature

Deliverable D8.5

The Dissemination and Communication Plan

Work Package 8 – Dissemination and communication

Deliverable Work Package Leader:
NGI

Revision: 0 – Final
Dissemination level: Public

February 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 776681.

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# Project information

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| Project period: | 1 May 2018 – 30 April 2023 |
| Grant Agreement number: | 776681 |
| Web-site: | www.phusicos.eu |
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# Summary

The overall ambition of this Dissemination and Communication Plan is to support the design and implementation of strategic communication in order to demonstrate how PHUSICOS can provide adequate proof-of-concept for the ability of NbS to address hydrometeorological events in sensitive rural and mountainous regions. Thus, this plan outlines PHUSICOS's dissemination and communication principles, key target groups and specific activities and communication channels to ensure significant project impact. The Dissemination and Communication Plan aims at maximizing the use of project deliverables, ensuring that key target groups receive the full, lasting benefits of the project results. This includes producing excellent interdisciplinary science which is theoretically informed and policy relevant as well as building new networks through clustering activities and connecting people and disciplines. This is the third and final version of the Dissemination and Communication Plan and therefore highlights the key dissemination and communication activities that will contribute to the long-term PHUSICOS legacy.

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# Appendix

# 1 Introduction and Project Overview

PHUSICOS, meaning 'According to nature' in Greek (φυσικός), is a five-year Innovation Action project that started in May 2018 and is funded by the European Union's Horizon 2020 research and innovation programme (Grant agreement No 776681). PHUSICOS aims to demonstrate how nature-inspired solutions reduce the risk of extreme weather events in rural mountain landscapes. The project consortium comprises 15 organisations from 7 countries, including end-user partners from local and regional administrative units in Norway, Italy, France and Spain.

The main objective of PHUSICOS is to demonstrate that nature-based/nature-inspired solutions for reducing the risk of extreme weather events in particularly vulnerable areas such as rural mountain landscapes, are technically viable, cost-effective and implementable at regional scale. Furthermore, they increase the ecological, social and economic resilience of local communities. PHUSICOS's underlying premise is that nature itself is a source of ideas and solutions for mitigating the risk caused by climate-driven hazards. As nature's designs are often elegant, effective and frugal, implementing nature-based solutions (NbS), including hybrid green/blue/grey infrastructure, can provide ecological, social and economic resilience for society.

Communication and dissemination are an important component of PHUSICOS to support the development and verification of NbS in rural mountainous areas, and to provide a basis for further exploitation of the developed technologies in the market. Specifically, Work Package 8 of the project (Dissemination and communication) is designed to ensure broad and effective dissemination of the PHUSICOS findings and results, including the outcomes of the demonstrator and concept cases.

This report outlines the PHUSICOS strategy for broad and effective communication and dissemination, which would ensure that the project results reach a wide audience and thus maximise the project impact. Further to this ongoing strategy, this is the third and final version of the Dissemination and Communication Plan and therefore highlights the key dissemination and communication activities that will contribute to the long-term PHUSICOS legacy.

# 2 Dissemination and Communication Principles

## 2.1 Disseminating versus Communicating

The EC has published guidance on the use of social media in H2020 projects to increase the impact of project communication (EC, 2018). This guidance document also provides useful information on how to distinguish between disseminating and communicating. This information is replicated in Table 1.

*Table 1: Differences between communication and dissemination (based on EC, 2018).*

| **Communication** | **Dissemination** |
|---|---|
| Covers the whole project (including results) and therefore begins at the start of the project. | Covers project results only and therefore begins after results are produced from the project. |
| Multiple audiences that include target groups beyond the project's own community. This includes the media and general public. | Specialist audiences refers to target groups that may use the results. PHUSICOS has identified six target audiences (Table 2). |
| Informing and engaging with society, to show how it can benefit from research. The PHUSICOS Living Labs approach at the different case study sites provide an important communication channel for the project. | Enabling the take-up and use of results which will be further developed in the PHUSICOS Exploitation Plan (D8.6) and the Plan for mainstreaming NbS in Europe (D8.7). |
| Legal reference Grant Agreement Article 38.1. The beneficiaries are obligated to promote the action and its results. | Legal reference Grant Agreement Article 29, also specifies that each beneficiary must ensure open access to all peer-reviewed scientific publications relating to its results as well as open access to research data. |

## 2.2 Open Knowledge Plan

Peer-reviewed publications generated in PHUSICOS will be provided in Open Access (OA) following the 'Guidelines on Open Access to scientific publications and research data in Horizon 2020', either in green or, in some cases, gold OA.

To support open knowledge, the PHUSICOS website (www.phusicos.eu) will contribute to the communication and dissemination of PHUSICOS and will be maintained for at least 10 years after project completion. PHUSICOS products to include policy briefs, videos, guides and reports will be made available on the PHUSICOS website. Scientific output (data and knowledge) will be centralised in the Open Access Infrastructure for Research in Europe (OpenAIRE), which will also serve as an entry point for linking publications to the underlying research data.

In addition to the website, the PHUSICOS web-based data platform includes an inventory of implemented NbS relevant for mountain areas. This evidence-base for implemented NbS is for demonstrating and maintaining data for NbS. The data platform is currently being supplied with relevant NbS cases to include factual information found in literature about each case. The PHUSICOS web-based tool has been developed according to the technical design for assuring the necessary compatibility with existing platforms. This facilitates the transition to the organisation that can support the long-term storage of this service. Currently preliminary discussions are taking place to establish the long-term legacy of these NbS in a relevant data platform. Three principal

options are identified which are not mutually exclusive options, and combinations are also being considered:

- Continue hosting at BRGM as an operative platform, integrated into other ongoing research programmes
- Port (move) the complete platform to a third-party host
- Deconstruct the platform into principal components (the database, specific software components, graphical user interface components etc) and distribute these to appropriate archival platforms (the OPERANDUM platform, NetworkNature data platform (https://networknature.eu/network-nature-case-study-finder) with links to the existing platforms of Oppla (http://www.oppla.eu), GitHub, etc.) to ensure accessibility and availability for reuse.

## 2.3 Graphic Design Identity

In the interest of promoting a unified image of the project, a PHUSICOS design identity has been developed for all dissemination and communication activities throughout the project period:

- The logo is compact and geometrically formed with triangles to represent mountains relative to the earth (Figure 1). The blue and green colouring reflects blue-green infrastructure inherent in NbS.
- A document template is created for report deliverables.
- All dissemination materials and activities will clearly state information on EU funding:
    - Display the EU emblem
    - Include the following text: “This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No. 776681.”
- All partner logos are to be used in dissemination materials. The logos are available in the reporting template, a standard acknowledgement slide for presentations (Appendix A) and in a standard poster presentation (Appendix B).

*Figure 1: PHUSICOS logo in horizontal format including the project name (left) and the logo graphic without the project name when rectangular formats are more appropriate (right).*

# 3 Target groups

Dissemination and communication activities will target specific groups including local stakeholders (e.g. local industry, authorities), regional authorities as well as public funding sources. PHUSICOS has specifically identified six key target groups (TGs). In addition to these specific target groups, PHUSICOS will target audiences beyond the project's own community to include the scientific community beyond the PHUSICOS consortium, the media and the general public. An overview of the different TGs is provided in Table 2 including links to the relevant work packages, which again reflect the PHUSICOS innovation actions. The different TGs will also be important for the PHUSICOS exploitation activities to be further developed in the Exploitation Plan (D8.6) and the Plan for mainstreaming NbS in Europe (D8.7).

*Table 2: Target groups for the PHUSICOS dissemination and communication activities and their respective links to the relevant innovation work packages (WPs).*

| TG | Short description | Relevant innovation WP |
|---|---|---|
| TG1 | National, European and International administrators and policy makers working with DRR, climate adaptation and water management | WP5: Governance innovation (particularly the through the Policy Business Forum) |
| TG2 | Local, Regional & National practitioners and contractors responsible for implementing/managing potential NbS | WP2: Case study sites<br>WP6: Learning arena innovation |
| TG3 | Private sector to include insurance, green banks and other businesses | WP5: Governance innovation |
| TG4 | Environmental groups and other NGOs | WP3: Service innovation (particularly through participation in the Living Labs) |
| TG5 | Academic networks working with NbS, DRR, CCA and water management and relevant H2020 NbS-related projects. | WP8: Dissemination and communication |
| TG6 | Stakeholders participating in the Living Labs approach at the case study sites | WP3: Service innovation and integration of Living Labs in innovation action WPs (WP4, WP5, WP6, WP7) |
| Media | Print media (newspapers), digital media (internet and television) and broadcast media (radio) | Cross-cutting over all WPs |
| Public | General public including inhabitants of the demonstrator and concept sites | WP2: Case study sites<br>WP3: Living Labs |

## 3.1 Administrators and policy makers

PHUSICOS will benefit from inputs provided by administrators and policymakers at the Global, European, and National levels. The Policy Business Forum (PBF) provides an important platform for interacting with this target group. The PBF will provide expertise on NbS funding and support to the demonstration and concept cases, and for proposing innovative ways to exploit opportunities and overcome barriers for implementing NbS.

Prior to establishing the PBF, a review of potential stakeholders to invite to participate was conducted. This resulted in an overview of over 100 stakeholders working with disaster risk reduction (DRR) and/or climate change adaptation (CCA) and/or nature-based solutions (NbS) and/or mountain issues (M) and/or CI (Critical Infrastructures). These stakeholders belong to different sectors (government, research, NGO, private sector and international organisations), and work at different levels (regional, national, European, global). Over the course of the PHUSICOS project, three PBF workshops have been carried out with participation from interested stakeholders that are subsequently identified as relevant stakeholders (listed in Table 3) to continue to remain in contact with after the completion of the PHUSICOS project.

*Table 3: List of organisations that have participated in the Policy Business Forum and are relevant for PHUSCIOS legacy to replicate and mainstream NbS in rural and mountain areas.*

| Organisation name | Topic | Type | Scope | Country |
|---|---|---|---|---|
| Business for nature (www.businessfornature.org) | NbS | NGO | Global | CH |
| Ecosystems for Disaster Risk Reduction and Adaptation (pedrr.org) | NbS/DRR/ CCA | NGO | Global | DE |
| European Association of Mountain Areas (www.euromontana.org) | NbS/DRR/ M | NGO | Europe | FR |
| European Bank for Reconstruction and Development (www.ebrd.com) | NbS/DRR/ CCA/CI | Private | Europe | UK |
| International Union for the Conservation of Nature (iucn.org) | NbS/CCA | NGO | Global | CH |
| Italian Centre for River Restoration (www.cirf.org) | NbS | NGO | National | IT |
| Global Infrastructure Basel Foundation (gib-foundation.org). | NbS/DRR/ CCA/CI | Private | Global | CH |
| Legambiente (www.legambiente.it). | NbS/DRR/ CCA/M | NGO | National | IT |
| Mountain Research Initiative (www.mountainresearchinitiative.org) | DRR/M | Research | Global | CH |
| UN Environment Programme (www.unep.org) | NbS/DRR/ CCA/CI | NGO | Global | CH |
| UN Office for Disaster Risk Reduction (www.undrr.org) | NbS/DRR/ CCA/CI | NGO | Global | CH |
| UN Environment World Conservation Monitoring Centre (www.unep-wcmc.org) | CCA/NbS | NGO | Global | UK |

## 3.2 Practitioners and contractors

The practitioners and end-user communities are central to the PHUSICOS project and provide important local knowledge and information regarding the unique challenges at each of the case study sites. Three end-user partners (local and regional authorities), representing the three demonstrator sites, are active partners in the PHUSICOS project:

- Innlandet County Authority, Norway
- Serchio River Basin Authority, Italy
- The Consorcio de la Comunidad de Trabajo de los Pirineos (CTP, meaning 'Working Community of the Pyrenees'), France and Spain

As partners in the project, they have the resources to fully participate and are active throughout the entire project. The PHUSICOS end-users as partners also initiate engagement with local, regional and perhaps national contractors for implementing and managing the NbS. Furthermore, the end-user partners have access to a wider target audience to address the transferability of the project, relevant for other end-users at the local, national, and European levels. An overview of specific contractors is forthcoming during the final reporting of the implemented NBS interventions (D2.4 Nature-based solutions implemented in PHUSICOS) to be submitted in M60.

## 3.3 Private sector

The innovation framework developed through PHUSICOS will enable the efficient development, technical verification and dissemination of new NbS. As such, the framework is particularly relevant for local business and the private sector with the interest or need to develop Green Infrastructure. These new opportunities can be related to the construction and maintenance of NbS (Eklipse, 2017) as well as to territorial growth in rural mountain areas. Job creation as a NbS co-benefit is included as one of the factors in the protocol for evaluation of the proposed NbS to be implemented at the demonstrator and concept case sites. New job opportunities are present both in the planning, design and verification of the NbS and in the actual construction activities.

Within the PHUSICOS project this has to a large degree been dependent on the case site owners as they are responsible for the organization and coordination of the work at their sites. For example, progress with the NbS have shown that farmers and private landowners are becoming very engaged in the Serchio River Basin as a result of the NbS at Lake Massaciuccoli. This experience was presented at the second PBF which explored the role of both the public and private sector in NbS mainstreaming. Nicola Del Seppia from the Serchio River Basin Authority presented "Payments for ecosystem services for NbS: an Italian case." In the Kaunertaul Valley, local companies that have established methods to revegetate steep slopes with ‘hydro seeding’ on mountain pastures after the skiing season are identified as valuable partners. They will evaluate the feasibility of and implementing the bacteria-assisted vegetation solution on the steep lateral moraines in the Kaunertal. In the Pyrenees, the NbS measures are starting to be implemented by private companies with the tenders for work sparking interest from the private sector.

Details are forthcoming during the final reporting of the implemented NbS interventions (D2.4 Nature-based solutions implemented in PHUSICOS) to be submitted in M60.

Within the project, the PHUSICOS Virtual Reality (VR) experience was developed to facilitate communication and learning about four different NbS implementations at the demonstration sites. The Norwegian company Sopra Steria won the bid as programming lead to create this product. The VEA vocation school was also involved to ensure pedagogical content of the VR experience, ecology, and the accurate representation of flora and fauna utilized in the various VR landscape scenes. The modules are created in open access and future activities include building on the PHUSICOS VR to increase the number of NbS examples that are available. Innlandet County, who has been responsible and lead the VR development, has for example already included the future development of the VR experience in a new HORIZON EUROPE research proposal.

Engagement of the private sector is also relevant for governance and includes insurance, green banks and policy-related businesses. Some private sector representatives are already indicated (Table 3) and have participated in the activities of the PBF. With regard to potential private sector funding opportunities, representatives from the World Research Institute reached out to PHUSICOS in 2021 scoping potential cases that could be supported by the Caterpillar Foundation through their grant programme to invest in sustainable natural infrastructure. The demonstrator case study site at Lake Massaciuccoli in the Serchio River Basin in Italy was of particular interest. Although the timing of the potential available funding and activities needed to be carried did not match, the contact is established and will be further pursued for future activities.

## 3.4 Environmental groups and other NGOs

Environmental groups and NGOs have been invited to participate in the Living Labs to be initiated at the demonstrator sites and concept cases (see Ch. 3.6). In general, organisations that have participated in the Living Labs sessions represent a broad range of stakeholders to include authorities, NGOs, planners, land owners, members from the community as well as from academia. Representatives from environmental groups and other NGOs include:

- Environmentalist Associations (for example WWF, LiPU)
- Nature conservation NGOs
- Park and recreation Association
- Canoe Association
- Alpine Hiking Association

Further to the Living Labs, the PBF has also piqued the interest of several NGOs (Table 3, Ch. 3.3). As mentioned previously, project partners working in the field of NbS and DRR will continue to remain in contact with after the completion of the PHUSICOS project. Of particular interest as a global driver of NbS for DRR is the PEDRR network which is a "clearinghouse for knowledge, training, advocacy and practice on Ecosystem-based Disaster Risk Reduction (Eco-DRR)."

## 3.5 Scientific community, academic networks and clustering

PHUSICOS places strong emphasis on integrated transdisciplinary research that creates a bridge between several academic disciplines such as Disaster Risk Reduction (DRR), Climate Change and Adaptation (CCA), water management as well as NbS. The partners in PHUSICOS will continuously collaborate to create synergies with academic networks working in these disciplines, as well as other projects and initiatives of interest that might provide significant leveraging potential to PHUSICOS. Examples include:

- The European Climate Adaptation Platform (Climate-ADAPT, http://climate-adapt.eea.europa.eu) is a partnership between the European Commission (DG CLIMA, DG Joint Research Centre and other DGs) and the European Environment Agency. Climate-ADAPT is an initiative to help users access and share data and information on several aspects of climate change and adaptation strategies. The platform includes tools that support adaptation planning, case study search tool and an interactive map.
- JRC's Disaster Risk Management Knowledge Centre (https://drmkc.jrc.ec.europa.eu/) provides a networked approach to the science-policy interface in DRM, across the Commission, EU Member States and the DRM community within and beyond the EU. This Commission initiative builds on three main pillars of knowledge, partnership and innovation.
- PreventionWeb (http://www.preventionweb.net) is the leading portal for disaster reduction knowledge management and is curated by UNDRR. PreventionWeb serves the information needs of the disaster risk reduction community, including the development of information exchange tools to facilitate collaboration.
- Euromontana (https://www.euromontana.org/en/) is the European Association of Mountain Areas. Euromontana is the European multisectoral association for co-operation and development of mountain territories. It embraces regional and national mountain organisations throughout greater Europe, including regional development agencies, local authorities, agriculture organisations, environmental agencies, forestry organisations and research institutes. This network has a convention every two years.
- NetworkNature (https://networknature.eu/) is a European network project for the NbS community to facilitate clustering activities between all the different NbS projects funded under Horizon 2020 and now Horizon Europe.
- Oppla (http://www.oppla.eu) is a new knowledge marketplace with a focus on ecosystem services, natural capital and nature-based solutions. Its purpose is to share, obtain and create knowledge to better manage the environment. Oppla is an open platform for practitioners, policy makers and scientists.
- The Partnership for Environment and Disaster Risk Reduction (PEDRR, http://pedrr.org/) is a global alliance of UN agencies, NGOs and specialists.
- NEMOR Network: Network for European Mountain Research: (http://nemor.creaf.cat/) is a network of institutions -public or private- undertaking research in mountain areas, who want to promote research in, and for the sustainable development of, these areas. The OPCC-CTP is member of this network.

Further to these established organisations, PHUSICOS has had and will continue to have continued collaboration with the sister projects funded under the same call as PHUSICOS (OPERANDUM, RECONECT):

- OPERANDUM (https://www.operandum-project.eu/): OPERANDUM delivers the tools and methods for the validation of Nature-Based Solutions in order to enhance resilience in European rural and natural territories by reducing hydro-meteorological risks. OPERANDUM has a strong focus on open air laboratories for Nature-Based Solutions to manage environmental risks.
- RECONECT (http://www.reconect.eu/): RECONECT demonstrates, references and upscales Nature-Based Solutions in rural and natural areas.

In particular, the RECONECT project will continue until the end of 2023 and therefore has indicated that they will have the capacity to incorporate key results from PHUSICOS and OPERANDUM in some of the final products as well as organise a final conference.

## 3.6 Stakeholders – Living Labs

Dissemination and communication activities are closely linked to PHUSICOS stakeholder engagement activities at the demonstrator and concept case study sites, which are promoted by the application of the Living Labs approach (WP3) with interfacing stakeholder participation in WP4, WP5, WP6 and WP7. The Living Labs methodology is a central feature of PHUSICOS in order to ensure a user-contribution innovation methodology. The aim is "to involve a range of committed stakeholders in real-life 'laboratory' settings to test and develop alternative solutions for complex challenges, such as climate adaptation or risk and uncertainty assessments."

Preparation of the Living Labs includes the identification of relevant stakeholders by means of a stakeholder analysis. A stakeholder is defined as any person who has a 'stake' or interest in a policy question. This is a very broad category and includes both persons involved in making a decision and those affected by it. Each of the case study sites has started Living Labs tailored to their local contexts. An overview of the groups of stakeholders participating in the Living Labs is forthcoming during the final reporting of this activity (D3.7 Report on lessons learned with Living Labs experience and lesson learned) to be submitted in M60.

## 3.7 Media

Project partners, especially case study site partners, have established contact with journalists for local and regional news coverage in newspapers, radio and television.

Two of the case study sites have in particular been successful in engaging the local media for a much broader outreach to raise awareness of their NbS interventions. In February 2021, the Serchio River Basin Authority cold report the NbS at Massacciuccoli Lake had made headlines in several local newspapers to highlight the progress of PHUSICOS in dialogue with local farmers - green solutions to reduce the hydro-meteorological risk

and improve the water quality are being implemented. The headlines read; "Green buffers for the health of Massacciucoli's water, "Massacciuccoli, the future of the lake is in the hands of EU", and "Kick off to the project for the protection of the Lake."

The Concept Case at the Kaunertal Valley in Austria and the video they made of their field work in the valley ( https://www.youtube.com/watch?v=OinquHXN3WE&t=116s) has also received interest from the local media to feature this case in two documentaries. The first is part of the prime time one-hour ALPENWEGE (https://tv.orf.at/orf3/stories/3009232/) sharing stories on different Alpine regions and their specialities. The Kaunertal Valley has been selected as it has an old smuggler's path to Italy with stories of secret baptisms in former time. The current plans will highlight these old paths and their history and then will share the new developments and PHUSICOS research being conducted in the valley. The film crew will accompany the research team from the University of Vienna and the University of Salzburg 3-4 days in the field this summer. The second feature will be for TIROL HEUTE (Tyrol today) which is more a local format introducing news from the state to be shared on their Austrian national television program which airs weekly.

## 3.8 General public

Communication is also essential to inform non-specialists. PHUSICOS will therefore also direct its communication activities towards the general public, including inhabitants and young students living near the demonstration and concept sites. Specifically, the local community will be invited to join site visits at the five case study sites. The site visits showcase the NbS and provide an informal platform for sharing knowledge and memory as well as societal awareness of building with nature. PHUSICOS also aims to involve citizens in the Living Labs at each of the case study sites (Ch 3.6).

For example, local farmers involved in the Living Labs at Massaciuccoli’s Lake for the Serchio River Basin demonstrator case study site, joined the PHUSICOS consortium during their excursion to the site. The farmers shared their stories about drought and flooding, as well as the challenges of transitioning to less intensive agriculture.

*Figure 2: Local farmers at Massaciuccoli's Lake sharing their experiences with the PHUSICOS consortium (photo: Vittoria Capobianco).*

# 4 Activities and communication channels

PHUSICOS has identified multiple communication channels to promote project activities and disseminate project results. These includes the project website, social networks, production of dissemination products, as well as the planning and execution of outreach events. Furthermore, participation at conferences and clustering activities and publishing scientific results will also be prioritised. An overview of these communication channels and dissemination activities is provided in Table 4, with additional details included in the subsequent chapters.

*Table 4: Summary of communication channels and dissemination activities for target groups (TG) and expected impact and status.*

| Activity | Description | TG | Expected impact | Status |
|---|---|---|---|---|
| Website | External dissemination of the project structure, news and key research findings for engagement of the wider public in the form of downloadable newsletter, brochures, posters and publicly available research reports. | TG1-TG6 | PHUSICOS project legacy (the website will be maintained for 10 years) and ensuring project outcomes are widely available. | Most comprehensive external communication channel, updated regularly and published results available. |

| | | | | |
|---|---|---|---|---|
| Multi-lingual brochures and posters | Well designed, high quality and multilingual story of the PHUSICOS project, its goals and what is to be accomplished to showcase nature-inspired solutions. Target for local users. | TG2, TG4, TG6 | Inspire broad stakeholder participation and interest in NbS. | Available and very useful to have available at external events. |
| Policy briefs | Minimum of 2 policy briefs related to Governance innovation (WP5) to summarise the best available evidence of NbS, potential barriers to implementing these solutions and strategies for addressing these barriers. | TG1, TG3 | Influencing attitudes of policymakers and insurance agencies for the implementation of NbS. | One published and another to be published. Appreciated by national and European policy makers. |
| Social media presence (Twitter) | A PHUSICOS account is established on Twitter with the aim of each partner submitting one 'tweet' a month to generate activity. PHUSICOS will also be exploited via each partner's established Facebook and LinkedIn profiles. | TG1-TG6 | Ensure broad dissemination of PHUSICOS, especially with individuals not previously identified within the TGs. | Used sporadically, difficult to engage most of researchers to contribute to this communication channel. |
| Stakeholder integration workshops | Three stakeholder integration workshops are planned, one at each of the three demonstrator case study sites and in conjunction with consortium meetings. | TG2, TG3, TG4, TG6 | Increase knowledge of NbS and support multi-stakeholder dialogue to solidify long-term stakeholder relationships. | Successful before the Covid-19 pandemic. Especially in areas where the Living Labs were established early in the project. |
| European multiplier seminars | Two European multiplier seminars convening representatives from relevant policy networks to be organised during selected consortium meetings, to introduce the outputs of the project and encourage the implementation of NbS in Europe. | TG1 | Influencing attitudes of policymakers for the implementation of NbS. | Replaced by the clustering activities and invitations ongoing policy networks. |

| | | | | |
|---|---|---|---|---|
| Policy Business Forum workshops | The PBF members will be involved in interviews, e-consultations, and three workshops. | TG1, TG3, TG4 | Strengthen the science-policy-business nexus. | Successful as online events. |
| Final international conference | Public Conference towards the end of the project to disseminate the PHUSICOS findings. This was organised in collaboration with the H2020 OPERADNUM project in December 2022. | TG1-TG6 | Ensure broad dissemination of PHUSICOS and increase confidence for NbS proof-of-concept. | Successful in combination with the OPERANDUM project and UNESCO as their global partner. |
| Site visits to demonstrator sites and concept cases | End-user partners and primary case study site partners will take the lead to invite interested parties (local, regional, national and European) to visit their site, showcasing locally implemented NbS. | TG1-TG6 | Increase knowledge of and generate enthusiasm for NbS and their upscaling throughout Europe. | Despite challenges from the Covid-19 pandemic, successful at the local level and especially when in conjunction with the Living Labs. |
| Participation conferences, workshops and events | Presentations and posters to promote the results of PHUSICOS at European and International conferences as well as events requested by the Commission. | TG1, TG5 | Contribute to scientific excellence. | High activity from research organisation partners and some of the case study partners. |
| Scientific papers | Minimum submission of 2 open access peer reviewed papers per WP (12). Special attention will be paid to collaborative papers to high impact internationally peer-reviewed journals. | TG5 | Contribute to scientific excellence and ensure PHUSICOS legacy. | Achieved this target with focus to publish in high level journals. Work will continue after the project. |

## 4.1 PHUSICOS website

The PHUSICOS website (www.phusicos.eu) will contribute to the communication and dissemination of PHUSICOS and will maintained for at least 10 years after project completion. From the PHUSICOS homepage (Figure 3) it is possible to navigate to additional pages for more detailed information about the project with some pages including several content blocks:

- About
- Case studies
- Publications/Results
- News

The website has been actively updated throughout the duration of the project, particularly through the 'News' content page, which will be used to announce events and activities that take place. Recently, all case study site descriptions have been updated to reflect the actual NbS implementations. Furthermore, all publicly available materials will be available on this website and will be downloadable, including deliverables and reports.


*Figure 3: Screen shot of the PHUSICOS website (www.phusicos.eu).*

## 4.2 Multi-lingual brochures and posters

Further to communication channels, PHUSICOS has produced relevant dissemination products with brochures and posters providing a presentation of the project in each partner's native language. A general brochure has been created and is available in English, French and Spanish (Appendix C). Additionally, a flyer has also been created which can be tailored to individual case study sites and written in the local language (template in English, Appendix D).

## 4.3 Policy briefs

The development of policy briefs by the PHUSICOS partners will disseminate the project outcomes and results to policy makers to transform results into policy priorities of the political agenda in relation to the implementation of nature-based solutions. A minimum of 2 policy briefs will be produced to highlight the outcomes of Governance innovation (WP5). The publications will be short, concise, and will present the PHUSICOS relevant findings in an engaging and convincing manner.

The first policy brief "Governance innovation through nature-based solutions" was generated based on the results generated from the 'NbS in-depth case study analysis of

the characteristics of successful governance models' (Deliverable D5.1) as well as the inputs from PHUSICOS partners during the World Café discussion held at the PHUSICOS Consortium meeting held in Lucca in October 2019 (Figure 4). A comparative review of governance frameworks for the implementation of NbS across three successful NbS cases was conducted. The cases included: i) mitigating flood risk through the restoration of the Isar River in Munich, Germany which has also been the PHUSICOS retrospective concept case; ii) halting deforestation and encouraging afforestation as measures to reduce flood/landslide risk in the Wolong Nature Reserve, China; and iii) reducing landslide risk with natural measures in Nocera Inferiore, Italy. The review highlighted governance innovation within three critical areas: polycentric governance, NbS co-design and financial incentives. Briefly, all cases emerged in the public administration that dispersed decision authority across multiple organizations (polycentric governance). Furthermore, all cases illustrate novel stakeholder participatory processes that influenced the eventual shape of the NbS (co-design). In the Wolong case, the local authorities consulted with villagers and designed and implemented novel incentives for households to monitor illegal logging in a nature reserve (financial incentives).

The second policy brief is based on Deliverable D5.3 'Governance innovations' which provides a comprehensive overview of the work of WP5 specifically addressing governance innovation, where governance goes beyond government to involve a network of state and non-state actors (e.g., business, civil society, expert communities) in the process of deciding on and implementing nature-based solutions policy.

*Figure 4: World Café activity to identify potential enablers for implementing NbS and new strategies for catalysing their adoption (photo: Amy Oen).*

## 4.4 Social media, NbS podcast series and videos

PHUSICOS aimed to use social media for announcing news, key findings, events and project outcomes. A PHUSICOS account (@phusicos) was established on Twitter. The goal was to have each partner write one ‘tweet’ each month to generate activity. The 'tweet' should be tagged with the #PHUSICOS for easy identification and subsequent retweet by the PHUSICOS handle. This goal was challenging to achieve due to limited engagement by a majority of the project partners. Successful use most likely would have required a project partner dedicated to dissemination and communication.

The Isar River Basin retrospective NbS concept case has been a driver for creating communication outputs that showcase NbS and the PHUSICOS project. Specifically, TUM has created the podcast series "PHUSICOS – According to 'Nature', a podcast about Nature-based solutions. The podcast series is available on Spotify (PHUSICOS - According to 'Nature', a Podcast about Nature-based solutions | Podcast on Spotify) and brings the listeners on a journey through the key topics in NbS with European case study sites highlighted as examples. In the 10 episodes, experts are interviewed on lessons learned from these case study sites. In addition to this podcase series, TUM created a short film to showcase the PHUSICOS Isar River Concept case. The film is available on youtube (PHUSICOS Isar River Concept case Look&Learn 2019 - YouTube) and includes interviews from project partners and highlights of the 'Look and Learn' visit from 2019.

The Concept Case at the Kaunertal Valley in Austria and the video they made of their field work in the valley (https://www.youtube.com/watch?v=OinquHXN3WE&t=116s) has also received interest from the local media to feature this case in two documentaries. The first is part of the prime time one-hour ALPENWEGE (https://tv.orf.at/orf3/stories/3009232/) sharing stories on different Alpine regions and their specialities. The Kaunertal Valley has been selected as it has an old smuggler's path to Italy with stories of secret baptisms in former time. The current plans will highlight these old paths and their history and then will share the new developments and PHUSICOS research being conducted in the valley. The film crew will accompany the research team from the University of Vienna and the University of Salzburg 3-4 days in the field this summer. The second feature will be for TIROL HEUTE (Tyrol today) which is more a local format introducing news from the state to be shared on their Austrian national television program which airs weekly.

CTP has also created short videos during the Living Labs that have been held at different locations in the Pyrenees for this Demonstrator case study site. The videos are in the local language with English subtitles and include explanation from experts and interviews from local inhabitants and actors to share their reflections on NbS. The first video is from of Erill la Vall in Catalonia and illustrates the challenges of erosion in the valley and the NbS designed to reduce this hazard (PHUSICOS: Living Lab en Erill la Vall (Catalunya, España) - YouTube). Additional videos are being made for other NbS intervention locations in the Pyrenees.

The podcast series and links to the you tube videos are and will be available via the PHUSICOS website for years to come. Further to this, they will be uploaded to the Network Nature Resources repository, as well as will be used by the PHUSICOS partners' communication channels in their continued work with NbS.

## 4.5 PHUSICOS Virtual Reality experience

A Virtual Reality (VR) format was selected as an innovative approach to education and training to facilitate communication and learning about the NbS implementations at the PHUSICOS demonstration sites. This VR experience is developed specifically for decision makers at the local (community level) and as a general learning tool for the public. The objective of having a VR solution as the backbone of the training programme is to improve understandings and familiarity of NbS as well as to introduce their potential in a wide range of contexts. To achieve this, Innlandet County partnered with NGI and The Green Vocational School, in co-funding the spin-off project PHUSICOS-VR, with additional contribution from the Norwegian Directorate of Environment.

The user experience includes visits to four of the demonstration sites, where each site presents a suitable NbS implementation:

- Jorekstad (Norway) – receded barriers for flood control
- Saint Elena (Spain) – terracing to control rockfalls
- Capet Forest (France) – reforestation for avalanche hazard mitigation
- Serchio River Valley (Italy) – vegetative barrier strips for erosion and contamination control

The VR product is accompanied by a webGL solution that only requires a web browser. This has been deemed necessary in order to reach as many people as possible, since the VR solution requires additional products in the form of VR goggles. Figure 5 provides a screen shot to illustrate the current version of the PHUSICOS-VR.
The VR experience is published on the Oculus Labs app store as a free (open access) VR game downloadable by any interested user. The source code is provided as open source via a GitHub repository, allowing additional modules (case sites) to be added by interested parties or future research projects.

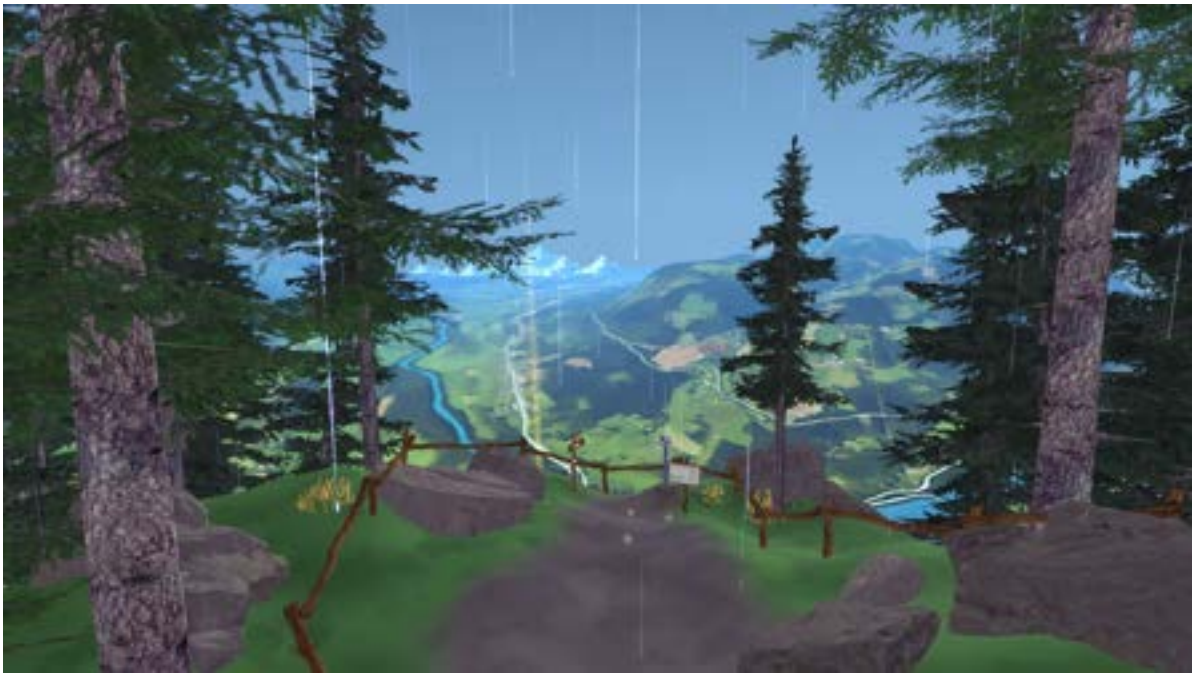

*Figure 5. Screen shot of the PHUSICOS-VR prototype illustrating the opening scene at the Gudbrandsdalen demonstrator case study site (a short teaser video is available on YouTube (https://www.youtube.com/watch?v=_KVSki7Y_Yc).*

## 4.6 Outreach events

Internal project workshops and seminars that were arranged throughout the project included:

- Stakeholder integration workshops: Three stakeholder integration workshops were planned, one at each of the three demonstrator case study sites and in conjunction with consortium meetings and invitation of the PHUSICOS External Reference Committee (PERC). Dynamic workshops methods were to be utilised to engage participants (e.g. invited speakers for storytelling, photo posters to ignite dialogue, group excursion with local guide). The first integration workshop with the PERC was held in Lucca, Italy (October 2019) in connection with the PHUSICOS consortium meeting and excursion to the Serchio River Basin demonstrator case study site. Unfortunately, the Covid-19 pandemic made travel difficult for organising additional stakeholder workshops with the PERC at the demonstrator case study sites. Rather, the demonstrator case study site partners have focused on active engagement with local stakeholders within the Living Labs. This has proven to be successful for creating enthusiasm for the NbS interventions, as well as ensuring support for continuing the work after PHUSICOS has concluded.
- Policy Business Forum workshops: The PBF members have been involved in interviews, e-consultations, and three workshops. Themes of the PBF workshops include: i) Why do we need NbS?, ii) How do we implement NbS?, and iii) How can we improve legislation, policy and implementation of nature-based

solutions? Due to the Covid-19 pandemic, all three workshops have been held online. Although not originally intended as such, this format has proven to be advantageous for engaging a diverse group of participants. The first workshop was held on March 24th, 2020; the second PBF workshop was held on April 19th, 2021 and the third PBF was held November 18th, 2022. Workshop summaries are published on the PHUSICOS website.

- Final international conference: PHUSICOS supported the OPERANDUM project's final conference at UNESCO's headquarters in Paris, France 2022. The International Conference on "Nature-based solutions for reducing hydro-meteorological risks" covered two days, with the first day focusing on the NbS HydroMet sister projects (PHUSICOS, OPERANDUM and RECONECT), their clustering activities and further exploitation. The second day targeted an even broader audience, both physically present and via streaming, and included a panel discussion on the science and policy gaps and challenges of NBS implementation in Europe (Figure 6). A Roundtable on nature-based solutions in the EU was also facilitated to discuss the challenges and lessons learnt. In this roundtable, several EU NbS funded projects were showcased. Videos from this second day are available via YouTube (OPERANDUM - YouTube).

*Figure 6: Panel discussion on the science and policy gaps and challenges of NbS implementation in Europe at UNESCO, Paris (photo: OPERANDUM).*

## 4.7 External conferences and events

The project partners have conducted an event mapping exercise to identify participation at important conferences, workshops and events (Deliverable D8.2 and D8.4), which provided an ongoing list of selected International and European conferences. Based on the experiences from participating at these events as well as the evolving NbS area of expertise, a list of selected external conferences and events is provided below to guide partners in continuing to promote PHUSICOS and the results from PHUSICOS in the first few years after project completion.

List of potential International and European conferences and events relevant for PHYSICOS legacy:

- Biennial Adaptation Futures conference of the Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA). The 2018 conference was held in Cape Town, South Africa and PHUSICOS was invited to give a pitch at the EU stand (https://adaptationfutures2018.capetown/). The last Adaptation Futures conference 2020/2021 was virtually hosted in New Delhi, the theme was Accelerating Adaptation Action. The Energy and Resources Institute will co-host the Adaptation Futures 2020 with the World Adaptation Science Programme (WASP). The next Adaptation Futures conference on global adaptation will be organized by Ouranos in partnership with the Government of Canada and WASP. It will take place 2-6 October 2023 in Montreal (https://www.ouranos.ca/af2023/).
- International Association for Landscape Ecology (IALE) holds a world congress every four years and the IALE (https://www.landscape-ecology.org/home.html) aims to develop landscape ecology as the scientific basis for the analysis, planning and management of the landscapes of the world. Three PHUSICOS partners (TUM, IIASA, UNINA) participated at the last World Congress held July 1-5, 2019 in Milan, Italy. The next IALE 2023 World Landscape Ecology Congress will be held in Nairobi, Kenya from 10-15 July 2023 with the theme "Transboundary Resource Management, Climate Change and Environmental Resilience".
- Biennial European Climate Change Adaptation (ECCA) conference is convened by EU-funded projects on behalf of the European Commission. PHUSICOS partners participated at the conference with specific presentations by UNINA (WP4) and NGI (NbS HydroMet Task Force) at the EASME stand. ECCA 2021 was held as an online digital event with PHUSICOS contributing to their virtual library showcasing the results of EU adaptation projects funded under Horizon 2020. ECCA 2023 will be held in Dublin, Ireland, in June 2023 with nature-based solutions for climate change adaptation a specific theme (https://www.ecca2023.eu/thematic-topics). Currently, the call for proposals for activities and events at the conference are open and PHUSICOS contributions are anticipated.
- Biennial Understanding Risk (UR) Forum (https://understandrisk.org/): The UR community convenes for five-day events that highlight best practices, facilitate

non-traditional partnerships and showcase the latest technical know-how in disaster risk identification A collaborative global community for disaster risk identification initiated by GFDRR. The last forum was held in 2022 in Florianópolis, Brazil and therefore was not prioritised. However, hybrid events are also becoming established in this forum and we will target the 2024 event for sharing NbS for disaster risk reduction to a larger global audience.

- Annual European Geosciences Union (EGU) General Assembly. In the 2020 Assembly the NbS HydroMet Task Force received approval to organize and lead an NbS session. Since 2020 various PHUSICOS partners have participated in EGU and this year (April 23rd – 28th) PHUSICOS will be well represented as session co-conveners as well as presenting the results from different aspects of the project. EGU will continue to be an important conference forum for project partners after PHUSICOS is completed as NbS becomes even more mainstreamed (there was only one session for NbS in 2019 and in 2023 there are nine sessions focusing on NbS).
- The 14th INTERPRAEVENT Congress will be hosted in Bergen, Norway, in May 2020 (https://www.interpraevent2020.no/). The theme is "Natural Hazards in a Changing World" and NGI will be participating. The INTERPRAEVENT Research Society works to set up preventive protection against disasters and supports interdisciplinary research to protect our living space against flooding, debris flow, avalanches and mass movements. INTERPRAEVENT 2024 will be held in Vienna, Austria from June 10th – 13th (https://interpraevent2024.at/) with an even more relevant topic "Natural hazards in a changing climate." This event is targeted as an important international arena for presenting the PHUSICOS project outputs in the context of prevention against natural disasters.
- NetworkNature organises events that PHUSICOS has supported and aims to continue to support, even after the completion of the PHUSICOS project. The next event is the 5th NetworkNature Nature-Based Solutions Taskforces Cluster Meeting which will be held virtually on March 2nd, 2023. The online event brings together Taskforce members, NetworkNature, and the European Commission (European Research Executive Agency and DG Research & Innovation).

## 4.8 Scientific papers

Papers in scientific journals are important tools for knowledge sharing. To reach a wider audience, we aim to submit papers in scientific, sector/trade, national and in-house publications. To meet the EU H2020 requirements for open knowledge, all peer-reviewed publications generated in PHUSICOS will be provided in Open Access (OA). PHUSICOS aims for a minimum submission of 2 open access, peer-reviewed papers per technical work package (total of 12 papers). As of M36 about 20 scientific articles have been published in peer-reviewed journals. The NbS Special Issue in the *Sustainability* open access journal, which was led by TUM, provided an important channel for a significant number of these articles.

We continue to publish project results and are targeting high-impact journals to include Global Environmental Change (Publisher: Elsevier Ltd.), Nature Sustainability (Publisher: Nature Publishing Group), Water Research (Publisher: Elsevier Ltd.), Water Resources Research (Publisher: Wiley-Blackwell), Nature-Based Solutions (Publisher: Elsevier Ltd.), Agricultural Water Management (Publisher: Elsevier Ltd.), and Natural Hazards (Publisher: Springer Netherlands).

# 5 References

EC (2018): H2020 Guidance — Social media guide for EU funded R&I projects. v1.0 dated 06.04.2018.

EKLIPSE (2017): An Impact Evaluation Framework to Support Planning and Evaluation of Nature-based Solutions Projects. Report prepared by the EKLIPSE Expert Working Group on Nature-based Solutions to Promote Climate Resilience in Urban Areas Centre for Ecology & Hydrology, Wallingford, United Kingdom.

# Appendix A

Standard acknowledgement slide for presentations

## Contents

# A1 Presentation slide of partners and EU H2020 funding information


This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 776681

*Figure 1: PHUSICOS acknowledgement figure to be included as last slide in Powerpoint presentations.*

# Appendix B

Poster presentation template

## Contents

# B1 PHUSICOS poster template


*Figure 1: PHUSICOS poster template that can be tailored for content and conference.*

# Appendix C

PHUSICOS Brochure

## Contents

PHUSICOS

WWW.PHUSICOS.EU

# Nature-based solutions to reduce risk

PHUSICOS – "According to nature" in Greek – is an Innovation Action project funded by the EU Horizon 2020 program. It will demonstrate how nature-based solutions provide robust, sustainable and cost-effective measures for reducing the risk of extreme weather events in rural mountain landscapes.

## Focus

PHUSICOS's underlying premise is that nature-based solutions are cost-effective and sustainable measures inspired by nature that attenuate, and in some cases prevent, the impacts of natural hazard events and thereby reduce human and financial costs due to better and more flexible disaster risk management. The research project aims to demonstrate the ability of nature-based solutions to increase the ecological, social and economic resilience of local communities at established case study sites with risks associated with different hydro-meteorological hazards (flooding, landslides, erosion and drought).

## Consortium of partners

PHUSICOS's excellence relies on a strong transdisciplinary consortium of partners with wide expertise and long experience from public authorities, research institutes and universities as well as private enterprises. The PHUSICOS expertise covers the fields of natural hazards and disaster risk reduction, climate scenarios modelling, GIS capabilities, geoinformatics and remote sensing, landscape architecture, landscape planning, nature conservation and ecosystem services, economics, governance and knowledge brokering to improve stakeholder involvement.

NGI · TUM · brgm · Università di Siena 1240 Centro di GeoTecnologie · R&D · IIASA · Université de Genève · universität wien · Oppland fylkeskommune · Autorità di Bacino Bacino Pilota del Fiume Serchio · CREAF · CTP · Universität Salzburg · agenceter

## LARGE-SCALE DEMONSTRATOR SITES

Valley of Gudbrandsdalen, Norway (above)

The Pyrenees, Spain-France-Andorra

Serchio River Basin, Italy

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 776681.

PHUSICOS

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# Solutions fondées sur la nature pour réduire le risque

PHUSICOS – « Fondé sur la nature » en grec – est un projet d'Action et d'Innovation financé par le programme Horizon 2020 de l'Union européenne. Il démontre de quelle manière les solutions fondées sur la nature apportent des mesures solides, durables et économiques pour réduire le risque d'événements météorologiques extrêmes dans les paysages de montagne ruraux.

## Focus

La prémisse sous-jacente de PHUSICO est que les solutions fondées sur la nature sont des mesures économiques et durables inspirées par la nature qui atténuent, et dans certains cas, préviennent les impacts des catastrophes naturelles et, par conséquent, réduisent les coûts humains et financiers grâce à une gestion plus efficace et plus flexible des risques de catastrophe. Le projet de recherche vise à démontrer la capacité des solutions fondées sur la nature à renforcer la résilience écologique, sociale et économique des communautés locales à des sites d'étude de cas précis exposés à des risques associés à différents risques hydrométéorologiques (inondations, glissements de terrain, érosion et sécheresse).

## Consortium de partenaires

L'excellence de PHUSICOS repose sur un solide consortium transdisciplinaire de partenaires avec une grande expertise et une longue expérience des autorités publiques, des instituts de recherche et des universités, ainsi que des entreprises privées. L'expertise de PHUSICOS couvre les domaines des risques naturels et de la réduction des risques de catastrophe, de la modélisation des scénarios climatiques, des capacités en matière de systèmes d'information géographique (SIG), de la géoinformatique et de la télédétection, de l'architecture du paysage, de l'aménagement du paysage, de la conservation de la nature et des services écosystémiques, de la gouvernance et de la transmission du savoir pour améliorer la participation des parties prenantes.

NGI · TUM · brgm · Università di Siena 1240 Centro di GeoTecnologie · R&D · IIASA · Université de Genève · universität wien · Oppland fylkeskommune · Autorità di Bacino Bacino Pilota del Fiume Serchio · CREAF · CTP · Universität Salzburg · agenceter

## SITES DE DÉMONSTRATION À GRANDE ÉCHELLE

Vallée de Gudbrandsdalen, Norvège (ci-dessus)

Les Pyrénées, Espagne-France-Andorre

Bassin du fleuve Serchio, Italie

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Ce projet a reçu le financement du programme de recherche et d'innovation Horizon 2020 de l'Union européenne dans le cadre de l'accord de convention n° 776681.

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# Soluciones basadas en la naturaleza para reducir los riesgos

PHUSICOS, que en griego significa «acorde a la naturaleza», es un proyecto de innovación financiado con el programa Horizonte 2020 de la UE. Tiene por objeto demostrar que las soluciones basadas en la naturaleza ofrecen medidas viables, sostenibles y rentables para reducir el riesgo de fenómenos meteorológicos extremos en zonas montañosas rurales.

## Enfoque

La premisa fundamental de PHUSICOS es que las soluciones basadas en la naturaleza ofrecen medidas sostenibles que atenúan y, en algunos casos, previenen, el impacto de las amenazas naturales. Por lo tanto, ayudan a reducir el coste humano y económico por medio de una gestión más eficaz y flexible del riesgo asociado a los desastres naturales. El objetivo de este proyecto de investigación es demostrar que las soluciones basadas en la naturaleza tienen capacidad de aumentar la resiliencia ecológica, social y económica de las comunidades locales. Para ello, se centra en emplazamientos de estudio de casos específicos en los que se dan diferentes riesgos provocados por fenómenos hidrometeorológicos (inundaciones, desprendimientos, erosión y sequía).

## Consorcio de socios

La excelencia de PHUSICOS se basa en un sólido consorcio transdisciplinar de socios que gozan de un amplio conocimiento y una larga experiencia formado por autoridades públicas, institutos de investigación y universidades y empresas privadas. La experiencia de PHUSICOS abarca los peligros naturales y la reducción del riesgo de desastres, la creación de modelos sobre los escenarios climáticos, las posibilidades que ofrecen los SIG, la geoinformática y la teledetección, la arquitectura del paisaje, la planificación paisajística, la conservación de la naturaleza y los servicios de los ecosistemas, la economía, la gestión, y la transferencia de conocimientos para mejorar la participación de las partes interesadas.

## EMPLAZAMIENTOS DE DEMOSTRACIÓN A GRAN ESCALA

### Valle de Gudbrandsdalen, Noruega (arriba)

### Pirineos, España-Francia-Andorra

### Cuenca del río Serchio, Italia

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Este proyecto ha recibido financiación del programa de investigación e innovación Horizonte 2020 de la Unión Europea en virtud del acuerdo de subvención n.º 776681.

# Appendix D

PHUSICOS Flyer

## Contents

## TUM Contributions to PHUSICOS

### The Isar Concept Case

Isar River Restoration in the inner city of Munich (Photo: Lupp)

The ecological flood protection strategy implemented at the Isar between 1999–2013 is considered as a successful restoration project. As a concept case, it serves as a case study for both new initiatives and end users. In PHUSICOS, the TUM team together with the Isar stakeholders analyze the factors of success and lessons learned in order to disseminate these lessons on a larger scale, so that others can benefit. Isar stakeholders can benefit from PHUSICOS by developing new ideas and inspiration for further river restoration efforts and assessing further challenges such as long-term assessment and upscaling potentials.

### WP 3 – Service Innovation

This work package led by TUM expands the Living Lab approaches at all case sites. To engage stakeholders from civil society, authorities and administrations as end-users, SME and other researchers of nature-based solutions, WP 3 develops monitoring and evaluation methods for the different sites and their facilitators.

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# PHUSICOS

## Nature-Based Solutions to Reduce Risk in Mountain Landscapes

Flooding of Kvam village, Gudbrandsdalen in 2015 (Photo: NGI, Heidi Eriksen and Turid Wulff Knutsen, Oppland County)

PHUSICOS – “According to nature” in Greek – is an Innovation Action project funded by the EU Horizon 2020 program. It will demonstrate how nature-based solutions provide robust, sustainable and cost effective measures for reducing the risk of extreme weather events in rural mountain landscapes.

## Consortium of Partners

PHUSICOS brings together a transdisciplinary consortium of partners with wide expertise and extensive experience from public authorities, research institutes and universities as well as private enterprises.


This project has received funding from the EU’s Horizon 2020 Research and Innovation Programme under Grant Agreement No 776681

## Objectives

Damage costs from extreme weather events such as floods, droughts, landslides or storm surges are very high, and increasing. Climate change will worsen this situation and increase risks to local populations, infrastructures and ecosystems. Although extreme hydro-meteorological events in mountainous regions often affect entire river basins, reducing these hazards in these areas do not receive the same attention compared to urban areas. Traditional engineering concepts like dikes and retention dams are costly, lack flexibility and may have negative impacts on mountain ecosystems.

The Sylvenstein Dam at the Isar River: It was considered at the time to safeguard ecological river functions, but it actually had a severe impact on the entire Isar ecosystem and did not in fact eliminate the downstream flood risk

The main objective of PHUSICOS is to demonstrate that nature-based and nature-inspired solutions for reducing the risk of extreme weather events in particularly vulnerable areas such as rural mountainous regions are technically viable, cost-effective and implementable at a regional scale. Furthermore, nature-based and nature-inspired solutions increase the ecological, social and economic resilience of local communities.

## The PHUSICOS Case Study Sites

Three demonstrator sites (DS) and two concept cases (CC) will serve as case study sites.

- DS: Valley of Gudbrandsdalen (Norway)
- DS: Pyrennees (France, Andorra and Spain)
- DS: Serchio River Basin (Italy)
- CC: Kaunertal (Austria)
- CC: Isar River Basin (Germany)

Location of the different study sites: Red – high risks, green – low risks (Graphic: NGI)

All regions face similar challenges of extreme weather events such as flooding, landslides, rock fall and debris flow. At the demonstrator sites (DS), facilitators together with local stakeholders and project partners will assess and evaluate benefits of nature-based solutions to jointly plan, develop and implement them in their regions. Concept cases (CC) will work on special focus issues. For the Kaunertal, a novelty nature-based solution will be developed, applied, tested and evaluated. The Isar case with an already implemented river restoration measure serves as a learning case for PHUSICOS.

## Project Structure

Overview of the project structure (Graph: NGI, Fohlmeister)

Implementing and mainstreaming nature-based solutions will require innovation actions. Five of the eight work packages address them:

- WP3: Engages stakeholders through Living Labs approach
- WP4: Designs a comprehensive framework to analyze and evaluate nature-based solutions
- WP5: Explores to enhance the effectiveness of planning and policy mechanisms
- WP6: Creates a knowledge co-generation platform with learning arenas
- WP7: Establish a comprehensive state-of-the-art data platform

WP1 (project coordination) and WP8 (communication and dissemination) flank the different work packages, while WP2 organizes different case sites and implements target measures which have been developed, selected and co-designed with local partners.