PHUSICOS

According to nature

Deliverable D8.4

The Dissemination and Communication Plan

Work Package 8 – Dissemination and communication

Deliverable Work Package Leader:
NGI

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Project information

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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 NBSs 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 second version of the Dissemination and Communication Plan, which will again be further developed in Month 36 (D8.5).

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Appendix

1 Introduction and Project Overview

PHUSICOS, meaning 'According to nature' in Greek (φυσικός), is a four-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, Spain and Andorra.

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 changing climate. 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 is an important component of PHUSICOS to support the development and verification of NBSs 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.

2 Dissemination and Communication Principles

2.1 Disseminating versus Communicating

The EC has recently 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 NBSs 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

All 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 as well as other methods acceptable to the EC which potentially become available during the project period.

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 newsletters, 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.

The web-based tool developed within PHUSICOS will be continuously supplied with new knowledge and information and used by the stakeholders, even after PHUSICOS will have been completed. The web-based PHUSICOS tool will be developed according to the technical design for assuring the necessary compatibility with existing platforms. The long-term support of this service will be addressed through the establishment of agreements with organisation(s) with the assignment to deliver information and services to the end-users.

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 NBSs.
- 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 NBSs 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 NBSs	WP2: Case study sites 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 to include other 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 the integration of the Living Labs in all 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 WP3: Living Labs

From each target audience, PHUSICOS will establish: (i) what needs to be done with dissemination/publicity to maximize impact, (ii) when is the most opportune timing to disseminate, and (iii) which medium or means is the most effective. A more detailed description of each target group is provided in the following chapters.

3.1 Administrators and policy-makers

PHUSICOS will benefit from inputs provided by administrators and policy-makers 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 NBSs.

A stakeholder database/list has been created that includes stakeholders working on 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). A total of 121 stakeholders have been identified and 25 have already confirmed their interest in the PBF (listed in Table 3). The PBF has been established with the first workshop to be conducted March 24th, 2020 and future workshops are planned for M30 and M40. Additional activities with the PBF include interviews, focus groups, surveys and/or e-consultations.

Table 3: List of organisations interested in collaborating with PHUSICOS partners in the research activities of the Policy Business Forum.

Organisation name	Topic	Type	Scope	Country
Centre Nationale de la Recherche Scientifique (CNRS)	DRR/M	Research	National	France
College of Architecture and Landscape Architecture	NBS/DRR/CCA	Research	Global	China
DKKV	DRR/CCA/NBS	Research	Global	Germany
DPC National Department of Civil Protection	DRR/NBS/M	Gov	National	Italy
ETH Zurich	CCA/DRR	Research	Global	Switzerland
EURAC Research	CCA/DRR/NBS /M	Research	Global	Italy
Food and Agriculture Organisation of the UN -Mountain partnership	DRR/CCA/M/ NBS	IGO	Global	Italy
Helmholz Zentrum Für Umwelforschung	DRR/NBS/M/C CA	Research	National	Germany
International Union for the Conservation of Nature	NBS/CCA	NGO	Global	Switzerland
Italy Civil Protection	DRR/NBS	Gov	National	Italy
Legambiente	NBS/DRR/CCA /M	NGO	National	Italy
LGI Consulting	NBS/CI	Private	Global	France
Lipu Birdlife Italy	M/NBS	NGO	National	Italy
Mountain Research Initiative	DRR/M	Research	Global	Switzerland
Munich Reinsurance	DRR	Private	Global	Germany
Munich Climate Insurance Initiative	DRR/NBS/CI	Private	Global	Germany
Naturem Solutions	NBS/CI	Private	-	-
PLANAT (Nationale Plattform Naturgefahren)	DRR/M	Gov	National	Switzerland
Po River Basin Authority	DRR/NBS/CI	Gov	National	Italy
Provincial Civil Protection Agency	DRR/NBS/M	Gov	Regional	Italy
Techand Ecology & Environ.Co.,LTD	NBS/DRR	Private	Regional	China
UN Environment World Conservation Monitoring Centre	CCA/NBS	NGO	Global	UK
Urbalia	NBS/CI	Private		France
URBiNAT	NBS	Private		France

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:

- Oppland 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'), Spain/France/Andorra

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 NBSs. 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 level. An overview of specific contractors is forthcoming during the development of PHUSICOS training programmes (project products) which began in Month 18 (WP6).

3.3 Private sector

The innovation framework developed through PHUSICOS will enable the efficient development, technical verification and dissemination of new NBSs. 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 NBSs (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 NBSs 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.

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 will participate in the activities of the PBF. The complete database/list of stakeholders relevant for the PBF provides additional strategic contacts in the private sector and PHUSICOS will reach out to these contacts for capacity building activities and exploitation of key results.

3.4 Environmental groups and other NGOs

Environmental groups and NGOs will be invited to participate in the Living Labs to be initiated at the demonstrator sites and concept cases (see Ch. 3.6). Appendix C provides a list of participants involved in Living Lab sessions, workshops and kick-off meetings at the demonstrator and concept case sites. 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

This list will become more complete as the Living Labs are established. Furthermore, some NGO representatives are already indicated (Table 3) and will participate in the activities of the Policy Business Forum.

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:

- 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 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 UNISDR. 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.

- Society for Ecological Restoration (https://www.ser.org/) is a global community of restoration professionals that includes researchers, practitioners, decision-makers, and community leaders. SER members are actively engaged in the ecologically sensitive repair and recovery of degraded ecosystems.
- The Partnership for Environment and Disaster Risk Reduction (PEDRR, http://pedrr.org/) is a global alliance of UN agencies, NGOs and specialist institutes.
- NEMOR Network: Network for European Mountain Research: http://nemor.creaf.cat/ The OPCC-CTP is member of this network and we sometimes organize events in this framework. The Network for European Mountain Research (NEMOR) 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.
- UNFCC (https://unfccc.int/): The United Nations Framework Convention on Climate Change (UNFCCC) and its annual Conferences of the Parties (COPs), which constitute the main decision-making body of the Convention, are the most important instrument of international cooperation in the field of tackling the impacts of climate change. During the COPs, high-level and side events are held.

Relevant H2020 funded projects with a focus on DRR and CCA can also be a source of information and inspiration as well as a channel for broader dissemination of PHUSICOS via H2020 project events include:

- PLACARD (www.placard-network.eu): PLACARD's (PLAtform for Climate Adaptation and Risk reDuction) mission is to be the recognised platform for dialogue, knowledge exchange, and collaboration between the Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) communities.
- RESCCUE (http://www.resccue.eu/): (RESilience to cope with Climate Change in Urban arEas) is Europe's first large-scale innovation and resilience project to improve urban resilience: the capability of cities to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage.
- ESPRESSO (http://www.espressoproject.eu/): (Enhancing Synergies for disaster PRevention in the EurOpean Union) aims to contribute to a new approach to natural risk reduction and climate change adaptation.
- CLIMATEUROPE (https://www.climateurope.eu/): H2020 project related to climate observations, earth-system modelling and climate service activities.
- ECOPOTENTIAL (http://www.ecopotential-project.eu/): H2020 project for improving future ecosystem benefits through earth observations.

Furthermore, continuous collaboration will be established with those projects funded under the NBS-related topics SCC-02-2016/2017, SCC-03-2016, SC5-08-2017, SC5-09-2016, and SC5-10-2016. PHUSICOS will also have regular communication with the other two projects funded under SC5-08-2017 to continuously support the operationalization of synergies. Relevant H2020 NBS-related projects include:

- CONNECTING Nature (https://connectingnature.eu/): Focuses on implementation of nature–based projects in urban settings. The impact of these initiatives will be measured to assess climate change adaptation, health and well-being, social cohesion and sustainable economic development in 11 European cities.
- GROWGREEN (http://growgreenproject.eu): A partnership for greener cities to increase liveability, sustainability and business opportunities. GrowGreen aims to create climate and water resilient, healthy and livable cities by investing in nature-based solutions (NBS).
- UNALAB (https://www.unalab.eu/): UNaLab aims to develop smarter, more inclusive, more resilient and increasingly sustainable societies through innovative nature-based solutions. The UNaLab project sets out to provide a framework for future upscaling of nature-based solutions in the 7 European cities and 3 non-European cities.
- URBAN GreenUp (http://www.urbangreenup.eu/): aims at developing, applying and validating a methodology for Renaturing Urban Plans to mitigate the effects of climate change, improve air quality and water management and increase the sustainability of our cities through innovative nature-based solutions.
    - The Project coordinator of URBAN GreenUp is a member of the PHUSICOS External Reference Committee.
- NATURVATION (https://naturvation.eu/): Will develop what nature-based solutions can achieve in cities, examine how innovation can be fostered in this domain, and contribute to realising the potential of nature-based solutions for responding to urban sustainability challenges by working with communities and stakeholders.
    - Stephan Pauleit (TUM) is a member of the project Task Force consisting of Associate Partners with extensive European and international experience of developing and implementing nature-based solutions.
- Nature4cities (https://www.nature4cities.eu): A comprehensive reference platform for NBSs, offering technical solutions, methods and tools to empower urban planning decision making. The platform will help addressing the contemporary environmental, social and economic challenges that face European Cities.
- ThinkNature (https://www.think-nature.eu) A multi-stakeholder communication platform supporting the understanding and promotion of Nature based Solutions.
- Eklipse (http://www.eklipse-mechanism.eu/): A knowledge and learning mechanism on biodiversity and ecosystem services. A large part of the EKLIPSE budget is made available to the wider community through open calls. EKLIPSE also conducts capacity building events.

Specifically, PHUSICOS, along with three other large scale NBS projects (NAIAD, RECONECT, OPERANDUM) have established their own Task Force on NBS for the reduction of hydro-meteorological risk. The aim of the NBS HyroMet Task Force is to leverage synergies and when possible work together to co-produce joint communication and dissemination products. The three other H2020 projects which constitute the NBS HydroMet Task Force are:

- NAIAD (http://www.naiad2020.eu/): Focuses on operationalisation of the insurance value of ecosystems for water-related risk mitigation, by developing and testing concepts, tools and applications on 9 demo sites across Europe, under the common concept of Nature Based Solutions (NBS).
- RECONECT (http://www.reconect.eu/): RECONECT demonstrates, references and upscales Nature-Based Solutions in rural and natural areas.
- OPERANDUM (https://www.operandum-project.eu/): OPERANDUM will deliver 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.

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. A list of participants is provided in Appendix C.

3.7 Media

Project partners, especially WP leaders and case study site partners, will establish contact with journalists for local and regional news coverage in newspapers, radio and television.

The Project Coordinator will write a press release for significant project developments and outcomes that will be available to all partners for translation to the local language.

This can include PHUSICOS's participation in global clustering events as well as announcing the release of project products during the last two years of the project.

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 six site visits at each of the five case study sites. The site visits will showcase the NBSs 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 who are 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.

Activity	Description	TG	Expected impact
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.
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 NBSs.
Newsletters	Biannual newsletters (in English) to highlight innovation actions (WPs) and the case study sites.	TG2, TG5	Communicate ideas for broader publication in ECs research magazines.
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 policy-makers and insurance agencies for the implementation of NBSs
Social media presence (Twitter, Facebook, LinkedIn)	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.
Blogging	Expert partners are registered to contribute articles to the JRC Disaster Risk Management Knowledge Centre and UNISDR's PreventionWeb	TG1, TG5	Knowledge exchange between science and policy to improve confidence in and use of NBSs.

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 NBSs and support multi-stakeholder dialogue to solidify long-term stakeholder relationships.
European multiplier seminars	Two European multiplier seminars convening representatives from relevant policy networks to be organised in months 24 and 36, to introduce the outputs of the project and encourage the implementation of NBS in Europe.	TG1	Influencing attitudes of policy-makers for the implementation of NBSs.
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.
Final international conference	Public Conference at the end of the project (M46) to disseminate the PHUSICOS findings.	TG1-TG6	Ensure broad dissemination of PHUSICOS and increase confidence for NBS proof-of-concept.
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 NBSs.	TG1-TG6	Increase knowledge of and generate enthusiasm for NBSs and their upscaling throughout Europe.
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.
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.

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 will be 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. Furthermore, all publicly available materials will be available on this website and will be downloadable, including deliverables, reports, and newsletters.

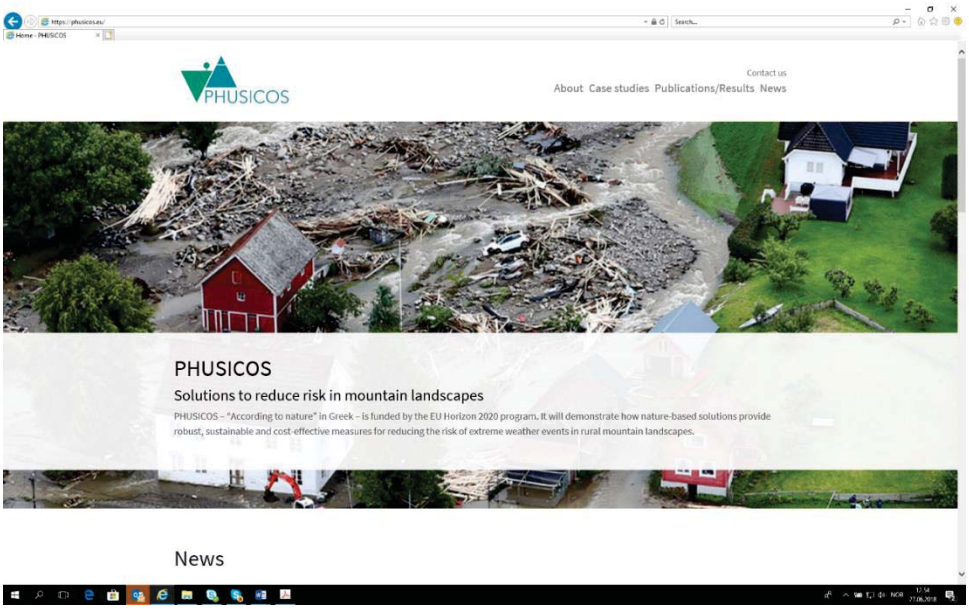

Figure 3: Screen shot of the PHUSICOS website (www.phusicos.eu).

4.2 Multi-lingual brochures and posters

Further to communication channels, PHUSICOS will produce 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 D). Recently, 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 E).

4.3 Newsletters

An electronic newsletter will be produced every 6 months (in English), containing information on project activities and other relevant news. The newsletters will be available on the website and will also be distributed to those who have indicated an interest in the project. The first newsletter gives the introduction on the project (Appendix F). Subsequent newsletters will highlight innovation actions (WPs) and the case study sites.

4.4 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.

Ideas for the first policy brief were generated during the World Café activity at the last consortium meeting. WP5 led the activity and collected to identify potential enablers to implementing NBSs and existing/new strategies for catalysing their adoption (Figure 4).

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

4.5 Social media presence

Social media will be used for announcing news, key findings, events and project outcomes. A PHUSICOS account (@phusicos) will be established on Twitter. The goal is 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. Project announcements will also be made available for communication via each partner's established Facebook, LinkedIn and Instagram profiles. Table 5 provides an overview over the PHUSICOS partner Twitter handles that will be used to communicate about the project. Social media channels that are most actively used by each partner are also indicated.

Table 5: PHUSICOS partners and their Twitter handle and their social media channels that are actively used indicated with an X.

Partner	Twitter handle*	LinkedIn	Facebook	Instagram
NGI	@InfoNGI	X	X	
UNINA	@Phusicos_U	X	X	
TUM	@UrbanRiverEU		X	X
BRGM	@BRGM_fr	X		
UNISI-CGT	@CGTH2020		X	X
RD	@risquesetdev	X	X	X
IIASA	@IIASAVienna	X	X	
ETHZ	@AnnaScolobig	X	X	
UNIVIE	@KrauchaarSabine		X	
Oppland	@Opplandfylke		X	
CTP/OPCC	@opcc_ctp	X	X	
ADBS	@ndelseppia		X	
CREAF	@CREAF_ecologia		X	X
PLUS	@rr_junker		X	
Agence Ter	@AgenceTerTeam		X	X

* For some partners, an individual will be responsible for providing PHUSICOS 'tweets' rather than from the official partner Twitter account.

4.6 Blogging

Expert partners are registered to contribute articles to the JRC Disaster Risk Management Knowledge Centre and UNISDR's PreventionWeb. Ideas for the first PHUSICOS blog article were generated during the World Café activity at the last consortium meeting. Specifically, the PHUSICOS assessment framework (WP4) explored how such a multi-functional assessment framework can support the implementation of NBS for DRR.

Additionally, TUM has been active with providing blog contributions to their faculty's wed page: https://www.landschaftsentwicklung.wzw.tum.de/mitteilungsarchiv/.

4.7 Outreach events

Internal project workshops and seminars include:

- 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 and invitation of the PHUSICOS External Reference Committee (PERC). Dynamic workshops methods will 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.
- European multiplier seminars: Two European multiplier seminars convening representatives from relevant policy networks to be organised in Month 24 and Month 36, to introduce the outputs of the project and encourage the implementation of NBS across Europe. The seminars will be organised in collaboration with established platforms (e.g. European Climate Change Adaptation Conference (ECCA), Partnership for Environment and Disaster Risk Reduction (PEDRR)).
    - PHUSICOS will, together with the NBS HydroMet Task Force, explore planning an NBS side-event at EU Green Week 2020 (June 1-5 in Brussels) which will focus on nature and biodiversity.
- Policy Business Forum workshops: The PBF members will be 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?
    - The first workshop is set for March 24th, 2020.
- Final international conference: Public Conference at the end of the project (M46) to disseminate the PHUSICOS findings. Open event and all stakeholders who have contributed to the project will be personally invited to attend. This event will be run in conjunction with UNISDR and collaboration with additional projects funded under the call will be explored.
- Site visits to demonstrator sites and concept cases.
    - As mentioned previously, selected consortium meetings take place close to the demonstrator case study sites and thus provide the opportunity to have study excursions (Valley of Gudbrandsdalen, Norway in June 2018 and Serchio River Basin, Italy in October 2019).
    - The Isar River Basin concept case conducted its first Look and Learn site visit with a focus on "blue" solutions. The visit took place in 20-22 March, 2019. The Isar River Basin concept case is a retrospective NBS case and therefore one of the main objectives is sharing experiences made with the project partners. The event was documented in a short film, which is available on the PHUSICOS website: https://phusicos.eu/case_study/isar-river-basin-germany/.

- To better understand the demonstrator case study sites and their needs for implementing NBS, relevant PHUSICOS partners have participated in site visits. Some of these site visits have included local stakeholders and brief reports with photos of the visits have been shared on the PHUSICOS website.

4.8 External conferences and events

The project partners have conducted an event mapping exercise to identify participation at important conferences, workshops and events. An ongoing list is provided below emphasizing International and European conferences. Although not specified here, it is anticipated that partners will also participate in relevant national conferences and local events. Partners that attend and present at conferences will report on their experiences by providing content to the PHUSICOS web-page as a news event that will also be available for further communication via social media.

PHUSICOS will also expose its results on the broad international platforms Future Earth (http://futureearth.org/) and the non-profit TED (https://www.ted.com). Future Earth will help accelerate the result of PHUSICOS demonstrations becoming international (e.g. within the United Nations' Sustainable Development Goals and climate and biodiversity agreements (United Nations Framework Convention on Climate Change and the Convention on Biological Diversity). TED will spread PHUSICOS' successes with NBSs to a worldwide audience.

Ongoing list of potential International and European conferences and events:

- Biennial Adaptation Futures conference of the Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA). The last conference was held in Cape Town, South Africa and PHUSICOS was invited to give a pitch at the EU stand (https://adaptationfutures2018.capetown/). The next Adaptation Futures conference is to be held in New Delhi, April 27-30, 2020 (http://adaptationfutures2020.in/). The theme is Accelerating Adaptation Action and the Energy and Resources Institute will co-host the Adaptation Futures 2020 with the World Adaptation Science Programme (WASP). PHUSICOS partner IIASA is planning to submit an abstract and attend the conference.
- International Union for Conservation of Nature (IUCN) World Conservation Congress is held once every four years and the IUCN (https://www.iucn.org/about/world-conservation-congress) and brings together several thousand leaders and decision-makers from government, civil society, indigenous peoples, business, and academia, with the goal of conserving the environment and harnessing the solutions nature offers to global challenges. IUCN has led the way with nature-based solutions and NBS events are expected to take place at the next Congress (next IUCN World Conservation Congress June 11-19, 2020 in Marseille, France). The IUCN NBS global standard aimed at incorporating NBS in decision-making processes will be officially launched during the Congress in Marseille and several partners aim to be present.

- 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 2021 European Landscape Ecology Congress will be held in Warsaw, Poland from 5-9 July 2021 with the theme "Making the future, learning from the past."
- International Congress on Environmental Geotechnics is held every four years with the next conference to be held June 2022 in Chania, Crete island, Greece (https://www.iceg2022.org/).
- 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 will be held in Ljubljana, Slovenia in 2021.
- Biennial European Ecosystem Services Partnership (ESP) Regional Conference. ESP is a worldwide network to enhance the science, policy and practice of ecosystem services for conservation and sustainable development (location and date of the 2020 conference is yet to be determined).
- Biennial International Association for Hydro-Environment Engineering and Research (IAHR) World Congress (next edition on July 4-7, 2021, Granada, Spain).
- Biennial International Association for Hydro-Environment Engineering and Research (IAHR) Europe Congress (next edition on June 30th - July 2nd, 2020, Warsaw, Poland, https://iahr2020.pl/). UNINA aims to participate in the Special session entitled "Hydraulic challenges and solutions in using vegetation for nature-based water management in riverine, lacustrine, agricultural, and urban settings".
- Biennial Permanent Conferences on Rural Spaces in Europe (PECSRL, http://www.pecsrl.org/), (next edition September 21st -25th, 2020, Jaén and Baeza, Spain with the theme " Living together in European Rural Landscapes").
- Biennial River Flow International Conference (next edition on July 7th – 10th, 2020, Delft, the Netherlands where TUM and UNINA plan have a joined talk about the WP4 Framework implementation at the Isar River Basin).
- Biennial International Symposium on Microbial Ecology. ISME18 is the 18th edition of our symposium and ISME18 will be held August 9-14, 2020 in Cape Town, South Africa (https://isme18.isme-microbes.org/).
- 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 next forum is to be held May 18-22, 2020 in Singapore. Proposals for technical sessions and side events are currently open.

- Annual European Council of Landscape Architect Schools (ECLAS) conferences (http://eclas.org/index.php/activities).
- Annual European Geosciences Union (EGU) General Assembly (next edition on May 3rd – 8th, 2020, Vienna, Austria and the NBS HydroMet Task Force has received approval to organize and lead an NBS session)
- Annual ICSSPN 2019: 22nd International Conference on Soil Science and Plant Nutrition (ICSSPN) (next edition January 23-24, 2020 in Paris, France).
- Annual International Conference on Building Resilience (next edition on January 13-15, 2020, Nusa Dua, Bali).
- Annual International Conference on Natural Hazards and Risk Reduction (ICNHRR) (https://waset.org/conference/2019/05/rome/ICNHRR) (next edition May 4-5, 2020, Rome, Italy).
- Annual International Disaster and Risk Conference (IDRC) (next edition in partnership with World Bosai Forum will be held November 9th – 12th 2019, Sendai, Japan).
- Annual International Federation of Landscape Architects (IFLA, http://iflaonline.org/) (next World Council and Congress to be held August 11-15, 2020 in Penang, Malaysia). European IFLA also holds events in Europe (next edition August 15-21, 2020, Dublin, Ireland).
- Annual Meeting of the European Environment Information and Observation Network (EIONET, https://www.eionet.europa.eu/). The OPCC-CTP participates every year in June, in Copenhagen, Denmark.
- Annual Open Living Lab Days of the European Network of Living Labs (ENoLL). The 11th edition of the OpenLivingLab Days taking place in 2020 (end of summer), will be hosted by imec.livinglabs and De Krook in the city of Ghent, Belgium.
- Assembly of European Regions (https://aer.eu/) holds events multiples times throughout the year. The AER aims to promoting regional interests in Europe and beyond as well as foster interregional cooperation to promote the exchange of experience and the development of regional policy. As such, AER is an important innovation network for PHUSCIOS.
- Society of Ecological Restoration (SER) is a globally community with biannual World Conferences (the last in September 2019) as well as regional conferences. SER Europe will be held August 31st – September 4th, 2020 in Alicante, Spain.
- IAEG Congress - Engineering Geology for a Sustainable World (http://iaeg.info/) organizes congresses that may be of interest. For example, the 13th International Symposium on Landslides (XIII ISL) will be held from June 15-19, 2020 in Cartagena, Colombia.
- The 4th International Conference EWaS4 on "Valuing the Water, Carbon, Ecological Footprints of Human Activities" is to be held June 24-27, 2020 on Corfu Island, Greece (https://www.ewas4.civ.uth.gr/). UNINA will host the Special Session entitled "Water Works Sustainability: Challenges and Innovative Approaches".

- The European Council of Landscape Architect Schools (ECLAS) will hold its next conference September 13-16, Uppsala, Sweden (http://conference.eclas.org/).
- The International miCROPe symposium will be held December 2-5, 2019 in Vienna, Austria. The theme of the symposium is "Microbe-assisted crop production – opportunities, challenges and needs" and PHUSICOS partners UNIVIE and PLUS will participate with a poster.
- 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.
- UNESCO African Rivers Forum, TUM projects to give a talk about “River Managers’ Split: nature conservation, energy production, and flood protection”, 12-14 February 2020.

4.9 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).

Potential International journals for future publications include:

- Applied Sciences (Open Access; MDPI; ISSN 2076-3417; CODEN: ASPCC7)
- Canadian Geotechnical Journal (ISSN: 0008-3674, E-ISSN: 1208-6010)
- Catena (Open Access; MDPI; ISSN: 0341-8162)
- Catena, An Interdisciplinary Journal of Soil Science - Hydrology - Geomorphology focusing on Geoecology and Landscape Evolution (supports Open Access, ISSN: 0341-8162): https://www.journals.elsevier.com/catena.
- Clean Technologies (Open Access; MDPI; ISSN 2571-8797)
- Climate (Open Access; MDPI; ISSN 2225-1154; CODEN: CLIMC9)
- Conservation Biology (Wiley; Open Access Option; Online ISSN:1523-1739): https://onlinelibrary.wiley.com/journal/15231739
- Eco.Mont. – Journal on Protected Mountain Areas Research and Management ISSN 2073-106X print version, ISSN 2073-1558 online version (open access)
- Ecological Applications (Wiley; Open Access Option; Online ISSN: 1939-5582): https://esajournals.onlinelibrary.wiley.com/journal/19395582.
- Ecology & Society (Open Access for all content): https://www.ecologyandsociety.org/.
- Engineering Geology (Open access; MDPI; ISSN: 0013-7952)

- Environmental Science & Technology (Open Access Option; ACS publications, Web Edition ISSN: 1520-5851): https://pubs.acs.org/journal/esthag.
- Environmental Science and Policy (Open Access Option; Elsevier; ISSN: 1462-9011): https://www.journals.elsevier.com/environmental-science-and-policy/.
- Environmental Systems Research (Springer Nature; Open Access, ISSN: 2193-2697):https://www.springer.com/environment/monitoring+-+environmental+analysis/journal/40068
- Environments (Open Access; MDPI; ISSN 2076-3298)
- European Planning Studies (Open Access Option): https://www.tandfonline.com/toc/ceps20/current.
- Forest Ecology and management (Gold Open Access Option; ISSN: 0378-1127): https://www.journals.elsevier.com/forest-ecology-and-management.
- Geofluids (Open Access, Hindawi, ISSN: 1468-8123 E-ISSN: 1468-8115)
- GeoHazards (Open Access; MDPI; ISSN 2624-795X)
- Géotechnique (Open Access Option, ICE Virtual Library, ISSN: 0016-8505, E-ISSN 1751-7656)
- Hydrogeology Journal (Open Access Option, Springer; ISSN: 1435-0157 - electronic version)
- Hydrology (Open Access; MDPI; ISSN 2306-5338)
- Integrated Environmental Assessment and Management (Open Access Option; Wiley; Online ISSN:1551-3793): https://setac.onlinelibrary.wiley.com/journal/15513793.
- International Journal of Coal Science and Technology (Open Access; Springer; ISSN 2095-8293)
- International Journal of Disaster Risk Reduction (Open access, Elsevier, ISSN: 2212-4209)
- International Journal of Energy and Environmental Engineering (Open Access; Springer; ISSN 2251-6832)
- International Journal of Engineering Science (Open Access Option; Elsevier;
- ISSN: 0020-7225): https://www.journals.elsevier.com/international-journal-of-engineering-science.
- Journal of Applied Ecology (Open Access Option; Wiley; Online ISSN: 1365-2664): https://besjournals.onlinelibrary.wiley.com/journal/13652664.
- Journal of Ecology (Open Access Option; Wiley; Online ISSN: 1365-2745): https://besjournals.onlinelibrary.wiley.com/journal/13652745.
- Journal of Environmental Management (Gold Open Access Option; Elsevier; ISSN 0301-4797)
- Journal of Environmental Planning & Management (Open Access Option): https://www.tandfonline.com/toc/cjep20/current#.
- Journal of Flood Risk Management (Open Access Option; Wiley Online Library; Online ISSN: 1753-318X)
- Journal of Geochemical Exploration (Open Access Option, Elsevier, ISSN: 0375-6742)
- Journal of Hydro-Environment Research (Gold Open Access Option; Elsevier; ISSN 1570-6443)

- Journal of Water and Land Development (Open Access; Polish Academy of Sciences; ISSN 2083-4535)
- Land Use Policy (Open Access Option; Elsevier; ISSN: 0264-8377): https://www.journals.elsevier.com/land-use-policy/.
- Landscape and Urban Planning (Open Access Option; Elsevier; ISSN: 0169-2046): https://www.journals.elsevier.com/landscape-and-urban-planning/.
- Landslides (Open Access Option; Springer; ISSN 1612-5118)
- Natural Hazards (Open Access Option; Springer; ISSN: 1573-0840)
- Natural hazards (Open Access, Springer, ISSN: 0921-030X (Print) 1573-0840 (Online)
- Natural Hazards and Earth Systems Sciences (Open Access, Copernicus Publications (https://www.natural-hazards-and-earth-system-sciences.net/about/aims_and_scope.html).
- Nature Sustainability (Open access, Nature, ISSN:2398-9629)
- Resources (Open Access; MDPI; ISSN 2079-9276)
- Restoration Ecology (Open Access Option; Wiley; Online ISSN:1526-100X): https://onlinelibrary.wiley.com/journal/1526100x.
- Science of the Total Environment (Open Access Option, Elsevier, ISSN: 0048-9697E-ISSN: 1879-1026)
- Soil Biology & Biochemistry (supports Open Access; ISSN: 0038-0717): https://www.journals.elsevier.com/soil-biology-and-biochemistry.
- Sustainability (Open Access; MDPI; ISSN 2071-1050; CODEN: SUSTDE)
    - TUM has been invited to lead a Special Issue on NBS. The title currently suggested is: "Nature-Based Solutions – concept, evaluation and governance".
- TOPOS Magazine (International review of landscape architecture and urban design): https://www.toposmagazine.com/.
- Water (Open Access; MDPI; ISSN 2073-4441; CODEN: WATEGH)
    - UNINA has been invited to co-lead a special issue on "Advances of Low Impact Development Practices in Urban Watershed" (https://www.mdpi.com/journal/water/special_issues/low-impact_development). This is an opportunity to highlights PHUSICOS NBS initiatives.
- Water Resources Management (Open Access Option; Springer; ISSN (electronic version): 1573-1650)

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

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

Appendix B

Poster presentation template

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B1 PHUSICOS poster template

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

Appendix C

Living Labs participants at case study sites

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C1 Gudbrandsdalen, Norway demonstrator case

Table C1 List of Participants at the Living Labs in Gudbrandsdalen.

Participant name	Institution	Function/Position in institution	Sector
Jon Halvor Midtmageli	Oppland County		Authority, Facilitation
Mari Olsen	Oppland County		Authority, Facilitation
Tor Taraldsrud	Skjåk municipality administration	Adviser, nature manager	Authority
Inga Gudrun Hyrve	Skjåk municipality administration	adviser flood protection/municipal risk reduction and emergency response	Authority
Elias Sperstad	Skjåk municipality	Mayor	Community
Øyvind Pedersen	Lom and Skjåk municipality	Planner	Planning
Erling Dagsgard	Agricultural management in Lom and Skjåk municipality	Head	Land Owners, farming
Amy Oen	NGI	Researcher	Science
Krister Kristensen	NGI	Researcher	Science
Kristin Hasle Haslestad	The Norwegian Water Resources and Energy Directorate	Senior engineer	Authority
Ola Hegge	fresh water fish management at the Innlandet County Governor	Senior adviser	Authority

C2 Serchio River Basin, Italy demonstrator case

Table C2 List of Participants at the Living Labs in the Serchio River Basin.

Participant name	Institution	Function/Position in institution	Sector
Enrico Bonari	Scuola Superiore S. Anna Pisa		Science
Tiziana Sabbatini	Scuola Superiore S. Anna Pisa		Science
Daniele De Nisco	Scuola Superiore S. Anna Pisa		Science
Roberto Giannecchini	Università di Pisa - Dip. Scienze della terra		Science
Marco Luppichini	Università di Pisa - Dip. Scienze della terra		Science
Nicola Silvestri	Università di Pisa - Dip. Scienze Agrarie, Alimentari e Agroambientali		Science
Andrea Fontanelli	LIPU		
Mario Cenni	ARPAT		
Sonia Giorgi	Coldiretti		
Massimo Lucchesi	ADBS		Authority
Benedetta Lenci	ADBS		Authority
Donella Consolati	ADBS		Authority
Nicola Del Seppia	ADBS		Authority
Andrea Di Grazia	ADBS		Authority
Nicola Coscini	ADBS		Authority
Marco Lenzi	ADBS		Authority
Pablito Bertoncini	ADBS		Authority
Stefano Cipriani	Associazione Culturale Le nostre radici		NGO
Roberto Balatri	Studio Gea		Planning, SME
Marie Claire NtibariKure	Regione Toscana		Authority
Leonardo Giannecchini	Consorzio di bonifica Toscana Nord 1		Authority
Antonio Difonzo	Consorzio di bonifica Toscana Nord 1		Authority
Riccardo Palmerini	Comune di Massarosa		Community
Agnese Marchetti	Comune di Massarosa		Community
Guido Dini	Comune di Massarosa		Community
Vittoria Giannini	Scuola Superiore S. Anna Pisa		Science
Daniele De Nisco	Scuola Superiore S. Anna Pisa		Science
Luca Lorenzini	Università di Pisa - Dip. Scienze della terra		Science
Monica Bini	Università di Pisa - Dip. Scienze della terra		Science
Stefano Natali	Università di Pisa - Dip. Scienze della terra		Science
Riccardo Cecchini	Legambiente Versilia		NGO
Gilberto Baldaccini	Legambiente - Forum Lago		NGO

Enio Paris	Università di Firenze - Dip. Ingegneria civile e dell'Ambiente	Science
Luca Solari	Università di Firenze – Dip. Ingegneria Civile e dell'Ambiente	Science
Mario Cenni	ARPAT	
Cristina Vannelli	Rete Ambientale della Versilia	NGO
Enrico Santambrogio	Rete Ambientale della Versilia	NGO
Lorenzo Maresca	Autorità Idrica Toscana	Authority
Angela Giudiceandrea	Amici della Terra - Forum Lago	NGO
Stefania Gatti	Comunità Interattive	NGO
Isabella Bonamini	ADBS	Authority
Stefano Sadun	ADBS	Authority
Roberta Della Casa	ADBS	Authority
Marco Lenzi	ADBS	Authority
Pablito Bertoncini	ADBS	Authority
Laura Mazzanti	Ente Parco Migliarino San Rossore Massaciuccoli	Authority
Luca Gorreri	Ente Parco Migliarino San Rossore Massaciuccoli	Authority
Alfonso Baiocchetti	Consorzio di bonifica Toscana Nord 1	Authority
Massimo Cerri	Forum del lago di Massaciuccoli	
Maria Pia Casini	Provincia di Lucca	Authority
Maurizio Marchetti	Comune di Vecchiano	Municipality
Claudio Gioia	Azienda Agricola La Costanza	Farmer, Land Owner
Cesare Studiati	Azienda Agricola Casa Rossa	Farmer, Land Owner
Paolo Panchetti	Cooperativa val di Serchio	Association, Farmers
Alberto Focacci	CIA Toscana Nord	Association, Farmers
Roberta Timpani	Comunità Interattive	SME, communication

C3 Pyrenees, Spain/France demonstrator case

Table C3 List of Participants at the Living Labs in the Pyrenees.

Participant name	Institution	Function/Position	Sector
Santiago Fabregas	ECGT Portalet		
Olivier Fryzou	PLVG		Regional development
Alain Masy	PLVG		Regional development
Olivier Breches	CACG	Assistant PLVG	Interest group regional development
Xavier Roger	DDT65		
Jerome Darré	CD64		Authority Departement
Patrice Billaut	CD64		Authority Departement
Pierre Escale	DTM64		Authority
Laurent Lespine	ONF-RTM		Land owner, management authority
Samy Leroi	R&D		Science
Idoia Arauzo	CTP		Facilitator
Isabelle Bouroullec	BRGM		Science
Anne-Valérie Hau-Barras	BRGM		Science
Christophe Garnier	BRGM		Science
Séverine Bernardie	BRGM		Science
François Peres	ENIT		
Rabab Yassine	ENIT		
Benjamin Mazery	PLVG		
Olivier Fryzou	PLVG		
Pascal Haurine	DDTM65		
Jerome Darré	CD64		Authority
Patrice Billaut	CD64		Authority
Olivier Blanchet	CD64		Authority
Eva Lamothe	CD64		Authority
Julien Latour	CD64		Authority
Patrick Carassou	CD64		Authority
Francois Sassus	ONF RTM		Land owner, management, authority
Sébastien Chauvin	FORESPYR		Association
Eric Leroi	R&D		
Juan Terradez	CTP		
Gilles Grandjean	BRGM		Research
Isabelle Bouroullec	BRGM		Research
Anne-Valérie Hau-Barras	BRGM		Research
Christophe Garnier	BRGM		Research
Rosalie Vandromme	BRGM		Research
Servando González García	Gobierno de Aragón		
Aurélie MESTRES	Parc National des Pyrénées		Authority
Christian Plisson	Parc National des Pyrénées		Authority
Robert Casadebaig	Commune de Laruns		Community, end user
Pascal Arribet	Commune de Barèges		Community, end user

C4 Kaunertal, Austria concept case

Table C4 List of Stakeholders in Kaunertal.

Participant name	Institution	Function/Positon	Sector
Stefan Ropac	CCCA		Association (Research)
Ernst Partl	Nature park		Authority
Manuel Wolf	BH Landeck		Authority
Josef Raich	Municipality Feichten		Community
Ulli Totschnigg	KLAR		Association (Association for Regions) Climate Change
Michael Holzapfel	TIWAG		Energy, Large Company
Philip Kirschner	Nature park		Authority
Josef Raich	Municipality Feichten		Community
Andrea Eckhart,	Glacier toll road/ski area		Company, Land owner, land management
Eugen Larcher	Glacier toll road/ski area		Company, Land owner, land management
Philip Kirschner	Nature park		Authority
Franz Wakernell	Glacier toll road/ski area		Company, Land owner, land management
Ernst Partl	Nature park		Authority
Markus	Shepards		Association
Robert Neururer	Hunters		Association
Ulli Totschnigg	KLAR		Association (Association for Regions) Climate Change
Daniel Frizzi	Glacier toll road/ski area		Company, Land owner, land management
Ernst Partl	Nature park		Authority

C5 Isar River Basin, Germany concept case

Several Living Lab processes are going in the Isar River watershed at various stages and intensities. Installed by the respective river management authorities, they are independent processes from PHUSICOS. The TUM team will accompany selected processes and Living Lab meetings during the lifetime of PHUSICOS.

Table C5 List of Stakeholders and Living Lab participants at the Isar.*

Participant name	Institution	Function/Positon	Sector
Bäumler, Klaus	City of Munich	former head of the Maxvorstadt District Council, City of Munich)	Administration
Binder, Walter	IsarAllianz / Mühltal initiative		NGO
Czisch, Wolfgang	Münchner Forum		Alliance of NGO
Döring, Nico	Planungsbüro "NaturProjekt"	Owner	Planning office, SME
Engelmeyer, Oliver	Planungsbüro Burkhadt - Engelmayer Landschaftsarchitekten Stadtplaner	Co-Owner	Planning office, SME
Gatter, Stefan	Department for Forest Policy and Environment, Bavarian State Ministry for Food, Agriculture and Forestry		Authority (Federal State)
Haber, Wolfgang	TUM Chair for Strategic Planning and Management	Emeritus Professor, Member of Expert Advisory Board for the Environment for the German Government	Resrarch
Janßen, Marta	Münchner Forum		Alliance of NGOs
Kaschek, Joachim	District Administration Bad Tölz		Authority, County level
Kirner, Stefan	River Management Department Munich		Authority, water, county level
Kriegsch, Roland	River Management Authority Weilheim	Head of the River Management Department, Weilheim	Authority, water, county level
Lang, Tobias	River Management Department, Weilheim, Sylvenstein Reservoir	Manager Sylvenstein Reservoir	Authority, water, county level

Lange, Sigrund	WWF	Head of the regional group	NGO, Nature conservation
Leeb, Christian	River Management Department Munich	Head	Authority, water, county level
Lintzmeyer, Klaus	Society for the protection the mountain environment	Head	NGO, nature conservation
Renner, Rolf	Canoe Association	Speaker	NGO, Recreation
Riedl, Johannes	River Management Department Weilheim		Authority, water, county level
Ruff, Tobias	Member of the City council		Policy
Rutschmann, Peter	TUM, Chair for Water Construction and Water Management	Head of Chair	Research
Schätzle, Robert	Department for Urban Planning and Building Regulation of the City of Munich		Authority, land owner, end user
Schaufuß, Daniela	Building Division of the City of Munich		Authority, land owner, end user
Schödl, Michael	Society for the Protection of Birds	Protected Area Manager	NGO
Schulze, Dora	River Management Department Weilheim)		Authority, water, county level
Schauer Thomas	Society for the protection the mountain environment		NGO, nature conservation
Speer, Franz, Rettet die Isar jetzt!	Save the Isar Now!		NGO, nature conservation
Türk, Patrick	Bavarian Fishing Association		Association
Unger, Fabian	Society for the Protection of Birds	Area Manager	NGO
Ulrich, Julian	Landscape Architect		SME
Weiß, Brigit	Society for the Protection of Birds	Area manager	NGO

Appendix D

PHUSICOS Brochure

Contents

PHUSICOS

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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 (Geoscience for a sustainable Earth) · Università di Siena 1240 Centro di GeoTecnologie · R&D Risques & Développement · 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.

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SITES DE DÉMONSTRATION À GRANDE ÉCHELLE

Vallée de Gudbrandsdalen, Norvège (ci-dessus)

Les Pyrénées, Espagne-France-Andorre

Bassin du fleuve Serchio, Italie

/ CONTACTS

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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.

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EMPLAZAMIENTOS DE DEMOSTRACIÓN A GRAN ESCALA

Valle de Gudbrandsdalen, Noruega (arriba)

Pirineos, España-Francia-Andorra

Cuenca del río Serchio, Italia

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Appendix E

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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Idea and Concept
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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.

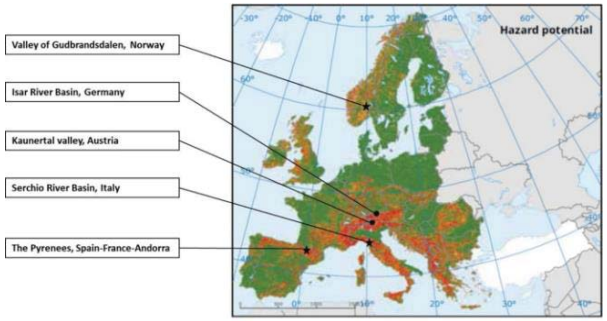
The Sylvenstein Dam at the Isar River: It was considered at the time to safeguard ecological river functions, but it actually had a severe impact on the entire Isar ecosystem and did not in fact eliminate the downstream flood risk

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.

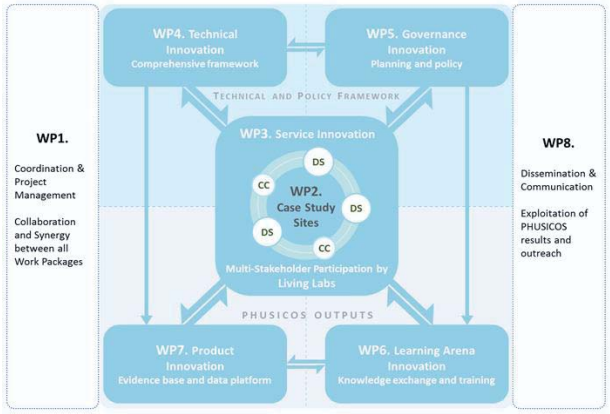
- DS: Valley of Gudbrandsdalen (Norway)
- DS: Pyrennees (France, Andorra and Spain)
- DS: Serchio River Basin (Italy)
- CC: Kaunertal (Austria)
- CC: Isar River Basin (Germany)



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.

Appendix F

Newsletter

Contents

Newsletter
PHUSICOS Aug. 2019

Solutions to reduce risk in mountain landscapes

The main objective of PHUSICOS is to demonstrate that nature-based solutions (NBS) provide robust, sustainable and cost-effective measures to reduce the hydro-meteorological risk in rural mountain areas. Three main case study sites in Italy, the Pyrenees and Norway represent large-scale demonstrator sites for implementation of NBSs. Additionally, two small-scale concept cases in Austria and Germany will test specific challenges. The case study sites are the core of PHUSICOS and each Newsletter will highlight a specific case to showcase ongoing NBS implantation activities.

Flood risk in the Valley of Gudbrandsdalen, Norway

The Gudbrandsdalen demonstrator case is located in one of the most populated valleys in Norway (Fig. 1). The area is rich with flood plains along the river that are extensively used as farmland. Furthermore, due to lack of other available land, many settlements are located along the river. Historically, the valley is susceptible to snowmelt flooding; however, this has been changing with an increased risk of flooding due to heavy rainfall, also in combination with snowmelt.

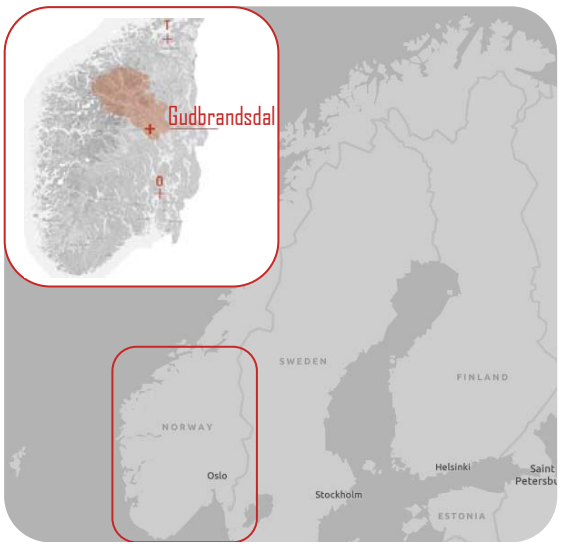


Figure 1. The Gudbrandsdalen demonstrator case study site is located in Oppland County in Norway.

Two major flood events in 2011 and 2013, causing massive damages to infrastructure along the river (Fig. 2), were the driving factor behind the initiative to draw up a Regional Master Plan for the Gudbrandsdalslågen and its tributaries.

Figure 2. Valley of Gudbrandsdalen during the flood of 2013. Photo by Heidi Eriksen and Turid Wulff Knutsen at Oppland County Authority.

The Norwegian Water Resources and Energy Directorate (NVE) conducted a preliminary flood risk analysis and concluded that the Gudbrandsdalslågen and its tributaries represent a significant flood risk. According to the EU Floods Directive, a comprehensive flood risk management plan should be completed for such areas.

<u>A receded flood barrier to increase the flood resilience of the area</u>

Based on the requirements of the EU Floods Directive, as well as input from municipalities in the area, the Oppland County Authority initiated work with the regional plan in the autumn of 2013. Among the measures to mitigate the flood risk prioritized by the Regional Master Plan, within the Innovation Action PHUSICOS project, a receded green flood barrier located at Jorekstad in Lillehammer municipality is proposed. The NBS consists in removing the existing flood protection along a section of the riverbank, and building a new flood barrier, using only natural and local materials, further upland of the riverbanks. This will provide space for the river during periods of flooding and improve the capacity for upstream flood levels, as well as contribute positively to the flood plain ecosystem. Furthermore it will protect the surrounding agricultural lands and the local football fields from flood damages (Fig. 3).

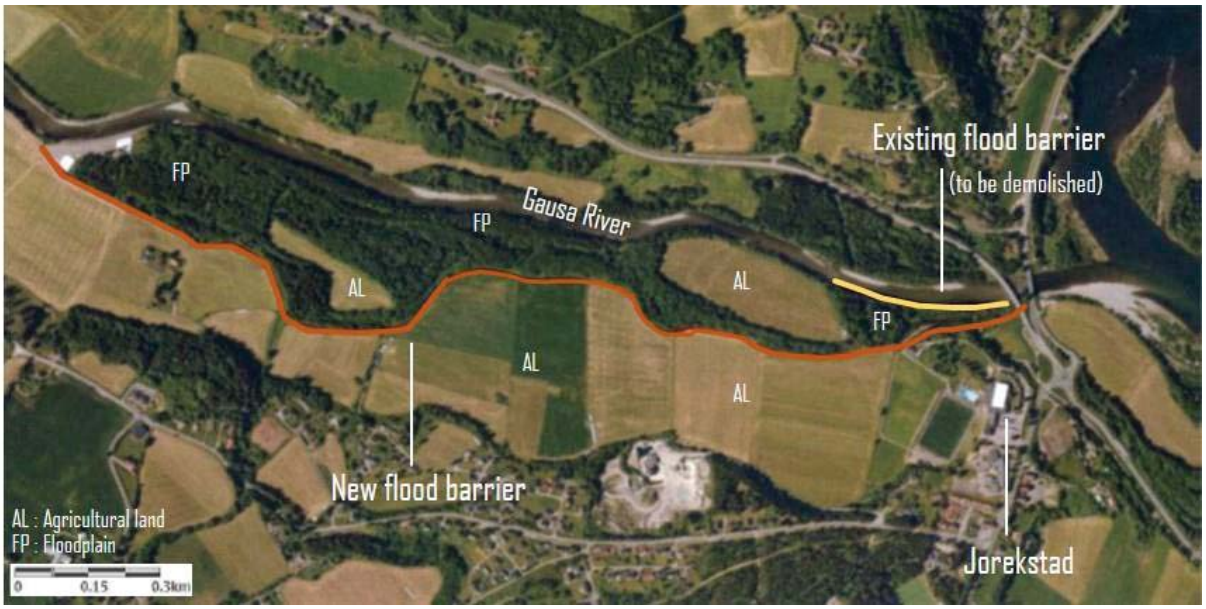


Figure 3. Aerial photo of the area with the location of the existing flood barrier and the new flood barrier.

Co-benefits of Nature Based Solutions

A numerical study using a hydraulic model was conducted to test areas most vulnerable to flooding and to assess the effects of different recommended measures. The currently proposed NBS measure at Jorekstad is a suitable intervention for the study area.

Impact assessments, including topics like the flood safety, the business community, the landscape, the local environment and outdoor recreation, biodiversity, the cultural environment and natural resources, were conducted for the different recommended measures evaluated with the hydraulic model. These assessments provide the baseline documentation for the PHUSICOS comprehensive framework assessment tool (see next article), that will be used to evaluate and verify NBS performance.

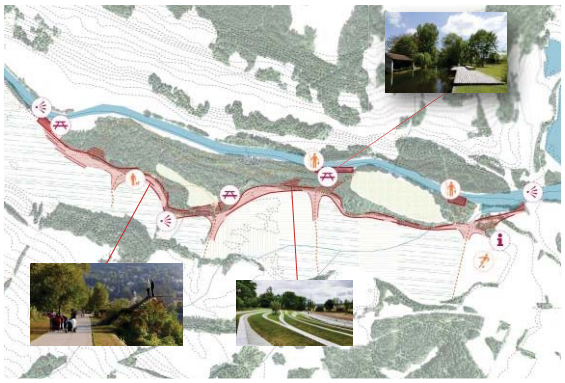


Figure 4. Visualization of the area with the potential multiple actions that can be supported by the flood barrier (conceptual illustration by Agence Ter).

Landscape intentions and ambitions

The Paris-based company AgenceTer, leader in urban planning and landscape development, is a PHUSICOS partner and has studied the Gudbrandsdalen case. The point of departure of their study entails reading the landscape in light of four key ambitions: FLUCTUATION: Revealing a water landscape - experiencing nature; INTEGRATION: Designing the dike as a natural structure; IMAGINATION: Reading the flood protection as a “line in the landscape”, and ACTIVATION: Imagining the dike as a dynamic and used structure.

They also have visualized the intentions of the receded flood barrier that can support multiple activities such as a fishing platform, picnic area, and panoramic views (Fig. 4), also considering different possible configurations of the barrier (Fig. 5).

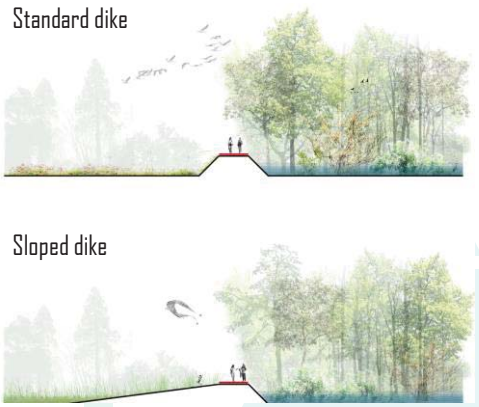


Figure 5. Possible configurations and geometries of the barrier or dike (illustration by Agence Ter).

The comprehensive NBS assessment tool

The University of Naples (UNINA) has developed the central assessment tool, which is a comprehensive framework to verify the performances of NBSs in risk management processes from both technical and socio-economic points of view (Deliverable D4.1). This comprehensive framework assesses the beneficial role of NBSs in ecosystem services, which is a crucial metric for the overall evaluation of the implemented intervention and solutions. In addition to ecosystem services, environmental, economic and social indicators are coupled with the above-mentioned risk management indicators, defining positive co-benefits, as well as potential undesirable side effects and social perceptions.

Methodology

The proposed methodology for the NBS assessment in rural and mountainous areas was developed building on existing frameworks put forth in other projects implementing NBSs in urban and rural areas (ISO, 2014; Raymond et al., 2017).
The method is based on the estimation of Performance Indicators (PI) through a multi-disciplinary aggregation and weighting methodology that allows comparison between different alternative design scenarios (e.g. Baseline scenario, NBS scenario, grey solution scenario).

The proposed framework and the indicators

The framework has been created taking into account the specific conditions of the context of the PHUSICOS demonstrator cases: rural and mountainous areas. The Performance Indicators (PI) were selected and categorized in a hierarchical scheme under five main ambits related to NBS performance: *Risk Reduction, Technical and Feasibility Aspects, Environment, Society, and Local Economy* (Fig. 6). For each ambit, criteria were defined (Table 1) and for each criterion, specific sub-criteria have been identified.

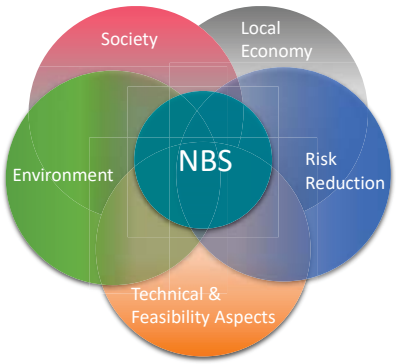


Figure 6. Scheme of the 5 Ambits of the framework assessment that can be affected by NBS performance (Deliverable D4.1).

Indicators have then been selected under each of the sub-criteria. The comprehensive framework includes in total 98 indicators.

AMBIT	CRITERION
Risk Reduction	Hazard
	Exposure
	Vulnerability
Technical & Feasibility Aspects	Technical Feasibility
	Economic Feasibility (affordability)
Environment	Water
	Soil
	Vegetation
	Landscape (Green Infrastructure)
	Biodiversity
Society	Quality of Life
	Community Involvement and Governance
	Landscape and Heritage
Local Economy	Revitalization of Marginal Areas
	Local Economy Reinforcement, including New Job Opportunities

For each indicator, features such as the *metric units*, *typology* (qualitative, semi-quantitative or quantitative), the *direction* (positive impact or a negative impact) and the information *source* (surveys, numerical modelling, stakeholder involvement, GIS, statistical data, sampling) are specified. A simplified version of the matrix is proposed in order to make the assessment tool more accessible and applicable in the specific local context (30 sub-criteria for a total of 57 indicators).

The assessment tool will be used for the demonstrator cases and should be further adapted to local context peculiarities and modelled through stakeholders' contributions.

PHUSICOS activities

Since the kick-off meeting in Oslo in June 2018, PHUSICOS has been actively participating in many NBS-related events throughout Europe to share projects results and support the Horizon 2020 NBS community of practice.

For example, in January 2019, the first joint meeting was organized for the four Horizon 2020 projects that comprise the Task Force on NBS for hydro-meteorological risk reduction: PHUSICOS, RECONECT, NAIAD and OPERANDUM to explore areas of collaboration and potential joint actions.

Within the PHUSICOS consortium, partners have taken part in activities including site visits to the demonstrator case study sites and the "Look and Learn" visit organized by TUM at the ISAR River Basin concept case in Munich where a large restoration along the river has been realized.

PHUSICOS has also been active at different scientific conferences. In April 2019, NGI gave a poster presentation at European Geosciences Union's (EGU) annual conference in Vienna. The poster highlighted the PHUSICOS project with the first proposed NBS solutions for the demonstrator sites and the potential benefits of using NBS in the related contexts. Many PHUSICOS partners (NGI, CTP and UNINA) participated at the European Climate Change Adaptation conference (ECCA) in Lisbon in May of this year. ECCA2019 showcased a broad range of H2020 initiatives related to climate adaptation to include climate services, co-creation and co-production as well as nature-based solutions. A key take-away message was that there is a need to improve the linkages between climate mitigation and climate adaptation, and NBSs can provide this link.

Web and Social media

To keep updated on the events, activities and conferences of the PHUSICOS project, visit our web page www.phusicos.eu or follow us on twitter (@phusicos).

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PARTNERS:

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