
PHUSICOS
Nature-based solutions in rural mountain areas
SNOW AVALANCHES
ROCKFALLS
EROSION and LANDSLIDES
FLOODS and DROUGHTS
Project Partners
Social Media


PHUSICOS
PHUSICOS, meaning “According to nature” in Greek, is an Innovation Action project funded by the EU Horizon 2020 program. The aim of the project is to support the implementation of Nature-Based Solutions as sustainable and cost-effective measures for reducing the hydro-meteorological risk in rural mountain landscapes.
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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Nature-based solutions are...
“...solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.” (EU, 2015)
https://ec.europa.eu/research/environment/index.cfm?pg=nbs


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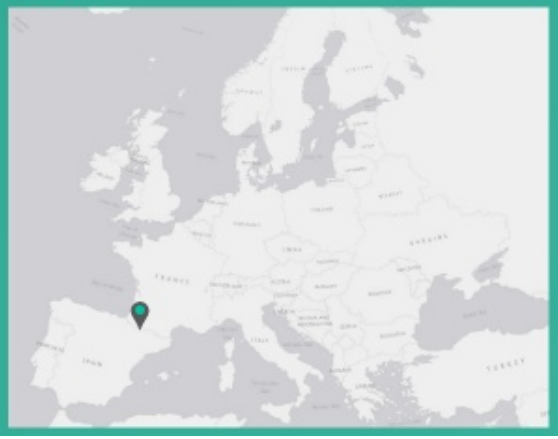
NBS
EROSION
and
LANDSLIDES
Vegetated
terraced
slopes
NBS
Kaunertal
valley
Concept
Case
Portalet
Santa Elena
Case
study
NBS
Seed
mixture
technique

The case study site at Portalet Santa Elena (Pyrenees-Spain)

The international road connecting the French and Spanish sides of the Pyrenees is vulnerable to natural hazards.
The till slope is prone to erosion and landslides that can cause traffic accidents and damages to the main road.

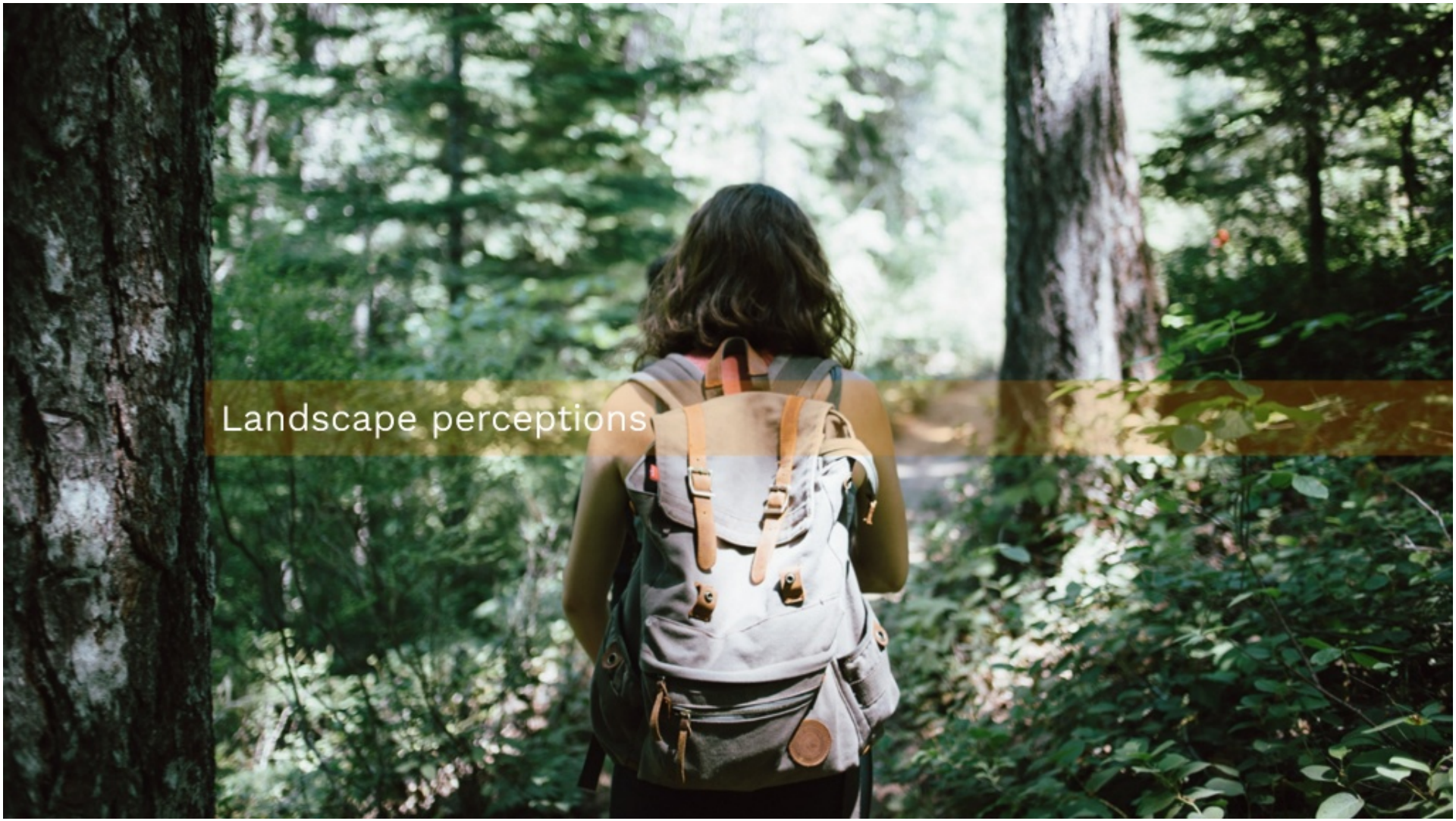


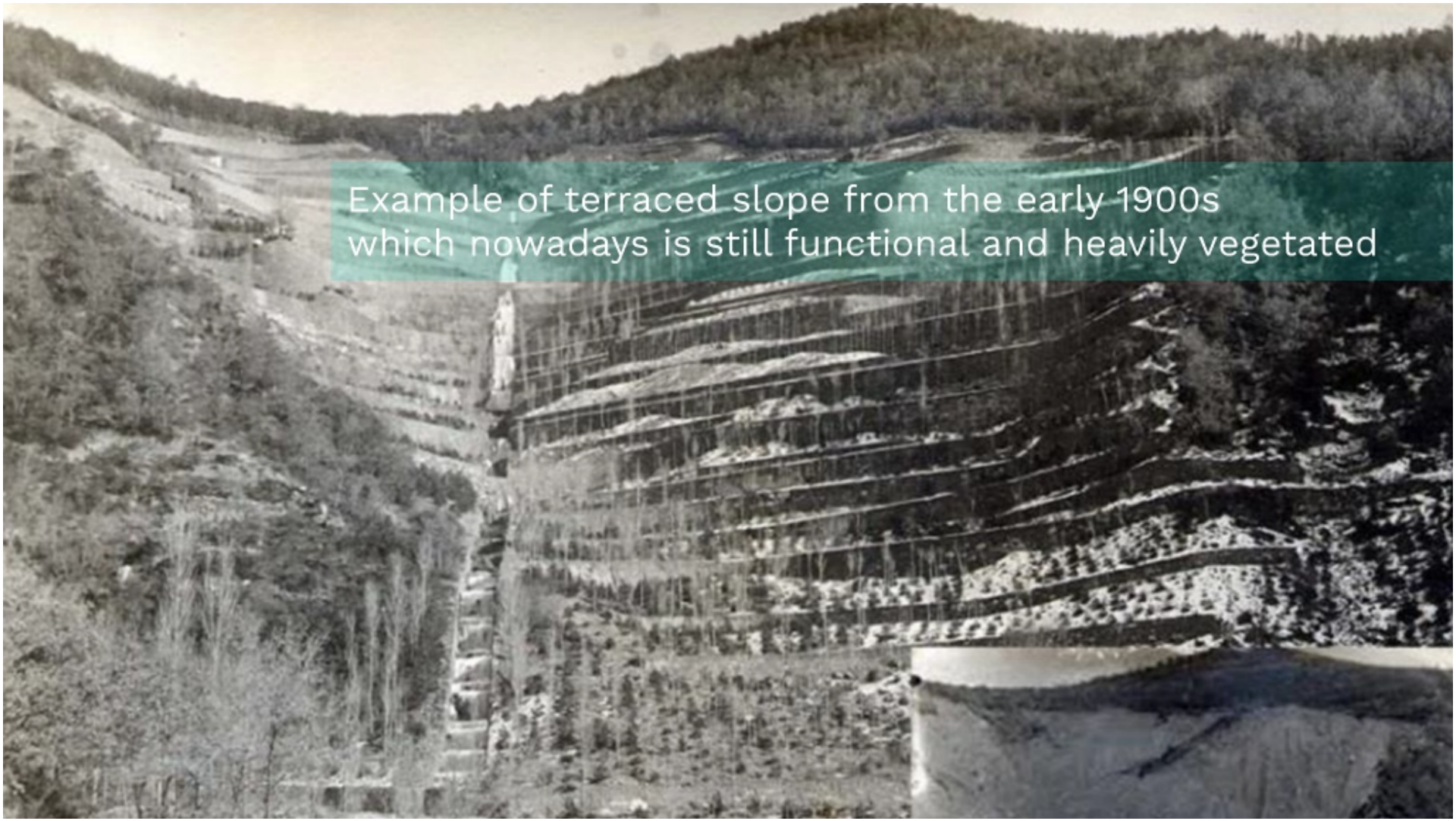

Ecosystem benefits
Economic Benefits
Societal Benefits
Risk reduction
Cultural Heritage


Reduction of the slope steepness
and vegetation to reduce the soil erosion


Increasing carbon sink capacity

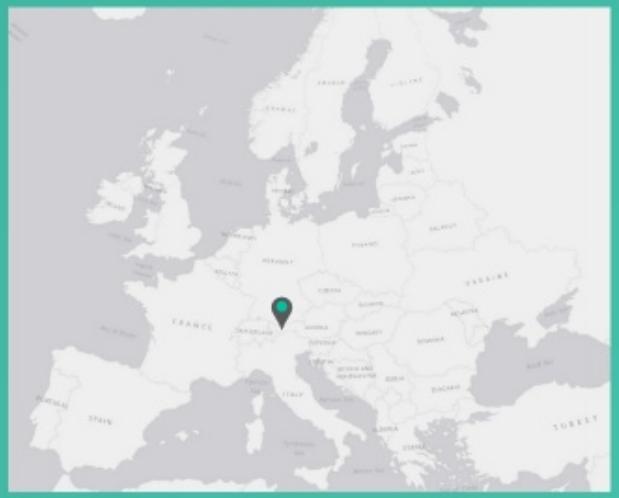

Reduction of the potential damages
to the exposed road

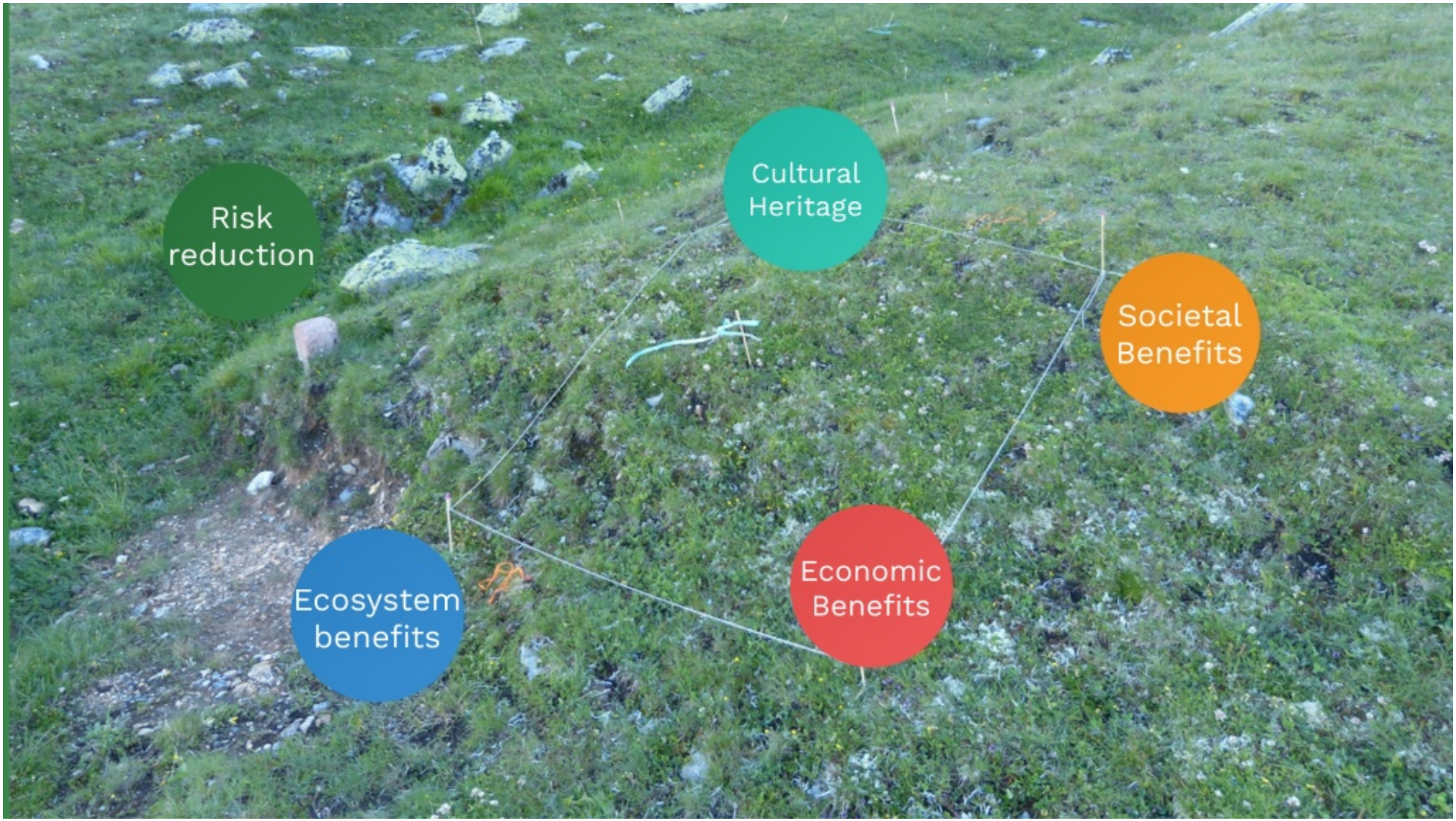

Landscape perceptions

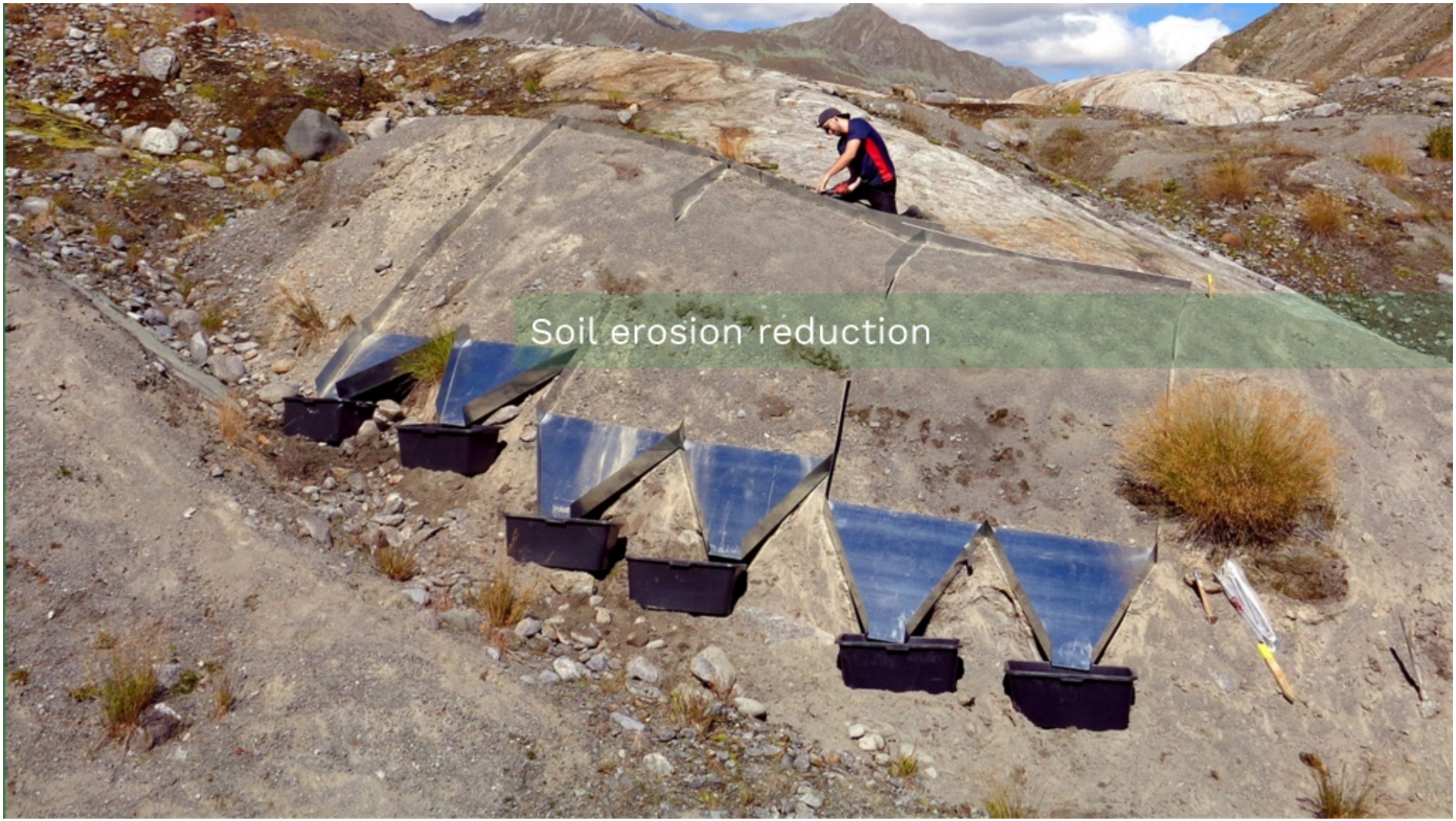

Example of terraced slope from the early 1900s
which nowadays is still functional and heavily vegetated

The Concept Case at Kaunertal valley (Austria)

Infrastructures in high mountain environments is affected by increased sediment loads. The retreating glacier has left massive deposits of the lateral moraine prone to erosion.




Risk reduction
Cultural Heritage
Societal Benefits
Ecosystem benefits
Economic Benefits


Soil erosion reduction


Enhanced biodiversity


Reduced costs for eroded sediment removal


Citizen awareness


Heritage for future generations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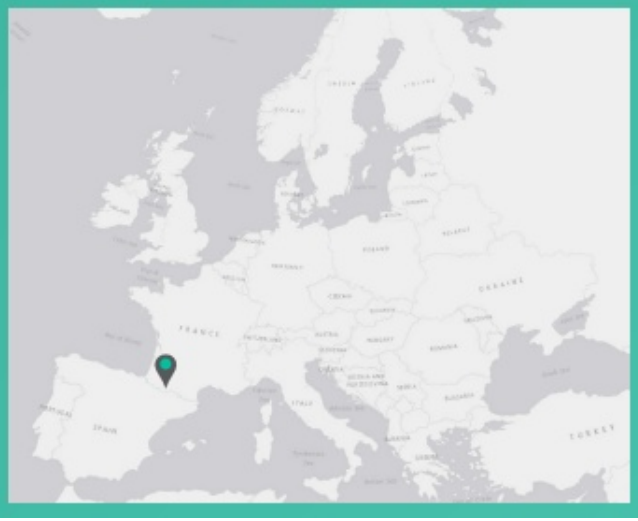
lOG FRAMES
NBS
Case
study
Portalet
Artouste

The Case study site at Portalet Artouste (Pyrenees-France)

The steep slope along the portalet Artouste road is regularly affected by rockfall, falling onto the road and causing damages and loss of lives.




Risk reduction
Cultural Heritage
Economic Benefits
Ecosystem benefits
Societal Benefits


Vegetation diversity


Rockfall risk reduction


Potential hiking trails


Reduction of road damages


Citizen awareness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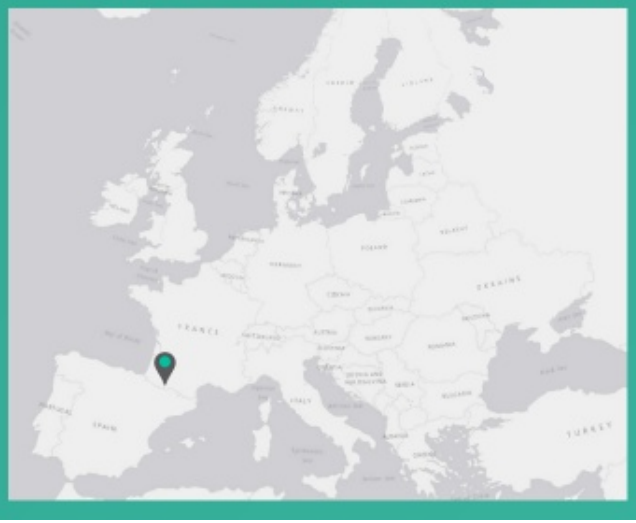
NBS
SNOW
AVALANCHES
Afforestation
NBS
Case
study
Bastan
Capet

The case study site at Bastan Capet (Pyrenees-France)

The forest of Capet has been devastated several times by snow avalanches that have reached the touristic village of Barèges, causing extensive damages.




Ecosystem benefits
Cultural Heritage
Economic Benefits
Societal Benefits
Risk reduction


Protection of the exposed village


Increased forest carbon sequestration

Avoided maintenance costs


Citizen sense of involvement and ownership


Example of recent afforestation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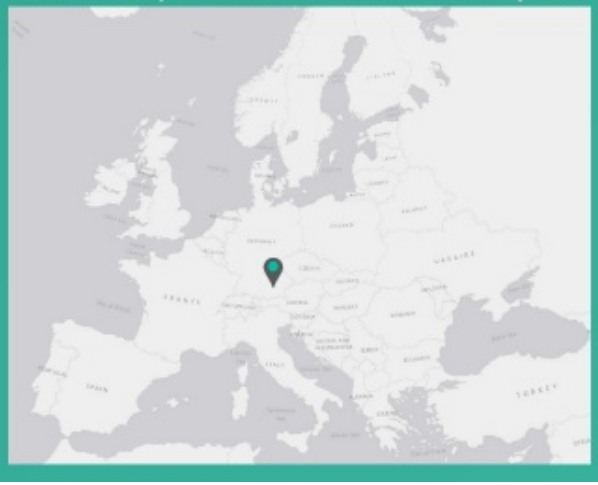
NBS
FLOODS
and
DROUGHTS
NBS
Step pool
system
NBS
River
restoration
Gudbrandsdalen
valley
Case
study
NBS
Flood
barrier
Concept
case
Isar
river
Bastan
river
Case
study
NBS
Buffer
strips
Serchio
river basin
Case
study

The Concept Case at Isar river (Germany)

The Isar river has been affected by sever flooding events in the past. The project for restoration was adopted and successfully improved protection against flooding through developing more of a natural river landscape, which allows space for the river to flood.




Ecosystem benefits
Economic Benefits
Societal Benefits
Risk reduction
Cultural Heritage


More room for the river


Enhanced biodiversity

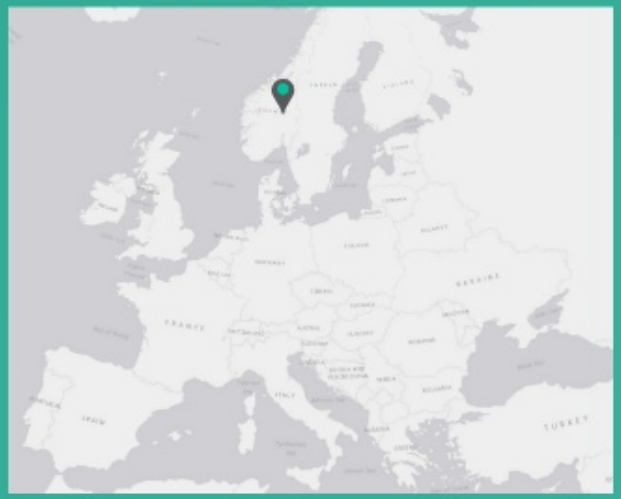

Boost to the local economy
kiosk isarwahn
kiosk isarwahn
5.50


Improved human well-being


Building long-term trust among citizens
Machbarkeit

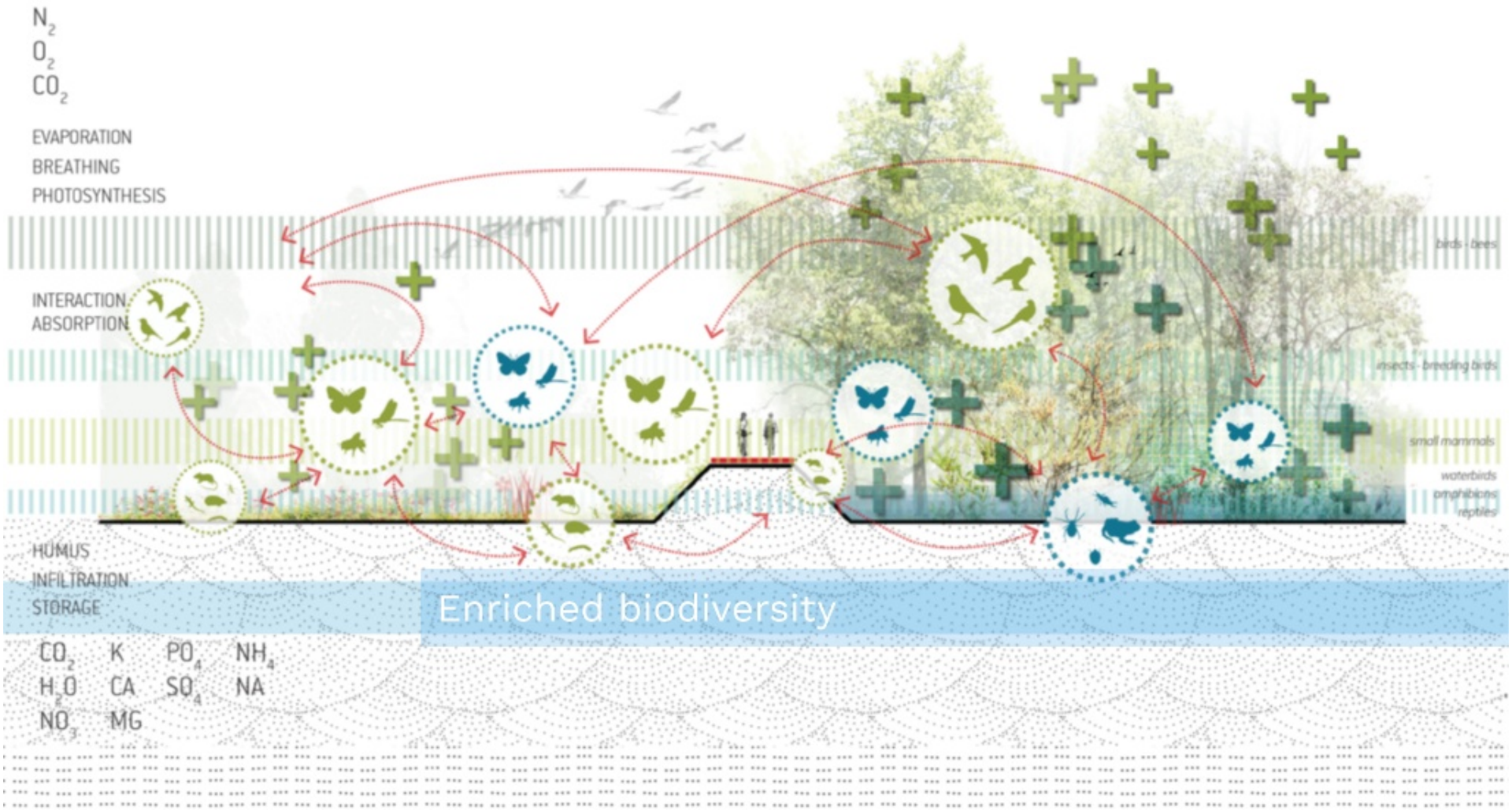
The case study site at Gudbrandsdalen valley (Norway)

Historically, the valley is susceptible to spring snowmelt flooding. This is now changing with more frequent flood events from heavy rainfall also during other seasons.




Ecosystem benefits
Economic Benefits
Societal Benefits
Risk reduction
Cultural Heritage


Protection of people and property


N_2
O_2
CO_2
EVAPORATION
BREATHING
PHOTOSYNTHESIS
INTERACTION
ABSORPTION
HUMUS
INFILTRATION
STORAGE
CO_2 K PO_4 NH_4
H_2O CA SO_4 NA
NO_3 MG
birds · bees
insects · breeding birds
small mammals
waterbirds
amphibians
reptiles
Enriched biodiversity

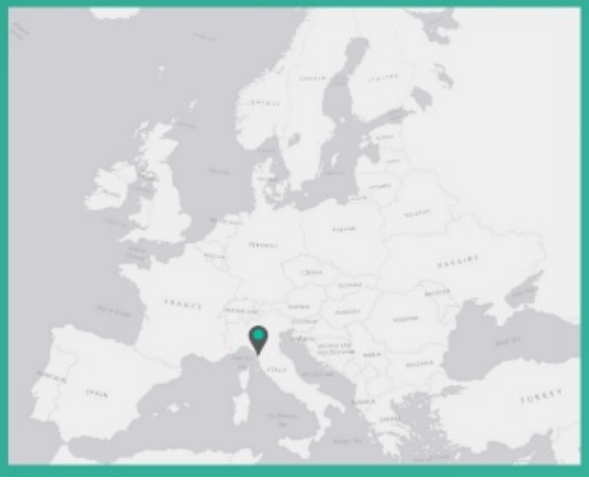
Enhanced agricultural activities


New opportunities for outdoor activities


Landscape heritage

The case study site at Serchio river basin (Italy)

Many of the irrigation channels between the Serchio River and the Massaciuccoli lake are affected by droughts and water pollution due to the heavy loss of soil in agricultural lands and the transport of soil.




Ecosystem benefits
Economic Benefits
Societal Benefits
Risk reduction
Cultural Heritage


Reduction of sediment runoff


Improvements for fish and fauna

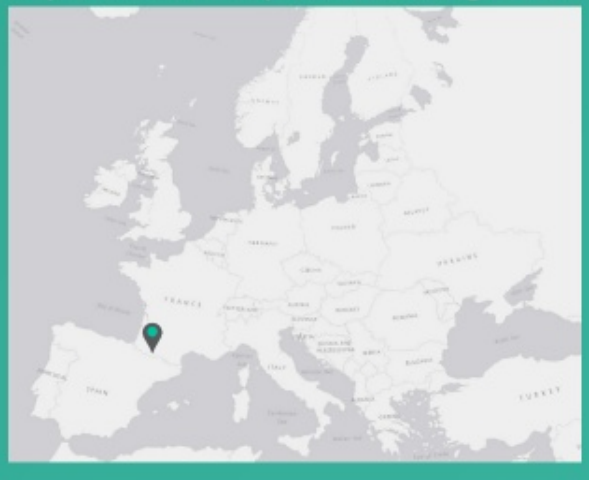
Enhanced agricultural activities

New recreational opportunities


Landscape heritage

The case study site at Bastan river (Pyrenees-France)

The Bastan river was affected by severe flooding events initiated by significant snow melting and heavy precipitation. Its confluence with the Gavarnie River represents a point of high flood risk.




Ecosystem benefits
Economic Benefits
Societal Benefits
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Cultural Heritage


Reduction of peak flows


Enhanced river vegetation


Increased sheep-farming and agricultural activities
along the river


Recreational activities along the riverside


Restore and improve local fish stocks


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OPPLAND
fylkeskommune
Autorità di Bacino
BACINO PILOTA DEL FIUME SERCHIO
CREAF
CTP
UNIVERSITÄT SALZBURG
agenceter
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