

MOUNTAINS' VULNERABILITY TO CLIMATE CHANGE: GOOD PRACTICES OF ADAPTATION AND MITIGATION

This booklet presents **concrete examples of how the adaptation and mitigation of climate change is playing out on the ground, of how theory is being put into practice.** For each chosen theme, two initiatives have been selected and described. They will be presented during the workshops. This booklet will give you an **overview of all the initiatives, including those presented in the parallel workshops you cannot attend.**

On the 4th October 2016, participants will attend two workshops, one in the morning (either **Agriculture & Forestry, Sustainable Energy and Water or Biodiversity and Protected Areas**) and a second one in the afternoon (either **Four Seasons Tourism, Transport and ICT or Innovative Management of Natural Hazards**).

In each workshop, **two initiatives will be presented for 10 minutes.** A 15 minute discussion between audience and speakers will follow the presentations. For the next **50 minutes, participants will be invited to discuss** in smaller groups in order to exchange experiences and to think about **recommendations for the local, regional, national and EU levels.** Participants will also be invited to think about **realistic actions** that Euromontana could perform in the future in order to support the adaptation to and mitigation of climate change in mountain areas. Finally, for the last **30 minutes**, participants from each workshop will wrap up and will define, with their Chair, **some common recommendations.** These recommendations will be presented in the afternoon in the whole plenary session.



AGRICULTURE AND FORESTRY

Climate change is obliging farmers to adapt. For example, changes in the structure of grasslands (i.e. distribution of species and soil types), are forcing farmers to shift between intensive and extensive land use and respond to new populations of pests and disease-causing organisms. Critically, the intensification of the hydrological cycle, glacier and permafrost retreat, and the predicted increase in the scale and frequency of extreme events might lead to significant increases in soil erosion and floods, with considerable effects on mountain farming.

Nevertheless, in some cases climate change could be seen as an opportunity as it can lead to increased productivity through higher temperatures and longer growing seasons. Such changes could provide opportunities to introduce new crops and farming practices. In addition, diversified agricultural activities (mowing, pasture, different levels of fertilization) can create new habitats, potentially increasing biodiversity. If biodiversity increases in mountain agrosystems there is the possibility that the quality of food for grazing animals will improve. Grasslands are a major carbon sink and agriculture plays a major role in the preservation of open habitats and the structure of landscapes. It is essential to think in an integrated manner to involve all local stakeholders, create synergies and thus maintain food security in years to come.

Forests cover 41 percent of Europe's mountain areas. Many of these forests are not particularly productive, but play key roles in providing ecosystem services by regulating the water cycle and by protecting settlements and other infrastructure from natural hazards such as avalanches, rock falls and floods. They also represent a great potential for biomass production and carbon storage, especially given the increasing levels of carbon dioxide in the atmosphere. In so doing, mountain forests contribute to climate change mitigation today and will continue to do so in the future.



CLIMATE CHANGE AND THE DURABILITY OF VINEYARDS IN THE DOURO VALLEY

Context

Viticulture in the steep mountains along the Douro valley is threatened by climate change. Over time, the successive winegrowers of the valley have implemented successful techniques to adapt to the natural handicaps of this mountainous area. Now, to sustain the production of wine in the Douro valley under conditions of climate change (rising temperatures, intense rain episodes, etc.), the techniques will have to be adapted again.

Project activities

This project tackled the issue of climate change following **two different approaches: attenuation and adaptation.**

- The attenuation activities aim to reduce carbon dioxide emissions and promote carbon sequestration, with actions such as sustainable ways of production (organic farming, integrated production), better management of waste, minimal tillage, promoting cover crops between vine rows, and applying foliar treatments to protect plants from water- and heat-related stress.
- On the other hand, the adaptation approach is more concerned with water management and the characterisation of grape varieties in order to select the most adapted species for the climate. Both studies are not conducted separately, but rather in synergy in order to be sustainable.



Results

- First of all, **minimum tillage** (once in 3 years, only during dry seasons) has been particularly successful in terms of restoring biodiversity and limiting erosion.
- Secondly, this project has collected a large amount of data on the effects of hydric stress on the vines and wine. The collaborators hope to use the data to **build a model predicting the impacts of future climatic variations on the valley's wine.**
- Finally, **different varieties of grape have been tried out** and new wines have already been commercialized.

Innovative Aspects: The mobilization of a wide variety of actors through a strong multi-actors approach has allowed the project to benefit from the knowledge of all the involved actors including: the Real Companhia Velha, a wine business company founded in 1756; ADVID, a professional association for the development of viticulture in the Douro valley; scientific and technological organisations at the national and international level; and Universities and higher level institutes. Findings from other projects like **Ecovitis** and **BioDiVine** have also been used.



ADAPTING FARMING PRACTICES TO CLIMATE CHANGE (AP3C PROJECT)

Context

This initiative focuses on the adaptation of agricultural practices to climate change in the French Massif Central. 85% of the Massif Central is covered by grasslands that capture 2 million tons of carbon every year: this is an asset in climate change mitigation.

The aim of the project is to rethink production systems to promote adaptation, a necessary condition of efficient mitigation.

Project activities

The list of **agro-climatic indicators** that will be calculated and projected by AP3C was developed by agricultural counsellors from the Chambers involved in the project. At the end of the project, around 30 indicators should be available. The indicators are mainly focused on grass and pasture management, but indicators on cereals, corn, vine and animal welfare will also be made available.

The daily climatic parameters used to build the indicators are **minimal and maximal temperatures, rainfall and evapo-transpiration** over the 2015-2050 period.

Results

Generally speaking, the climatic and agro-climatic predictions show a shortening of production cycles, an aggravation of the summer “off-peak”, partly compensated by a more important production in springtime and, in some cases, an extension at the end of autumn.

One original feature of the project is that it takes into account the **precise climatic variability increase**. This increase means that, among other things, there will be a **low decline or even a stabilisation of spring frost** and that vegetation will gradually start growing sooner. In practical terms, this suggests that farmers should resist the temptation to sow early, despite nice weather in the beginning of springtime.

Innovative Aspect: The project developed **climatic models compatible with the locally observed evolution (1980-2015)**. This is in contrast to typical climate models which are coherent at a global to regional level and over a long term (after the mid-twentieth century). Local models provide farmers with more accurate and useful data that allows them to better adapt to their actual and near-future situation.



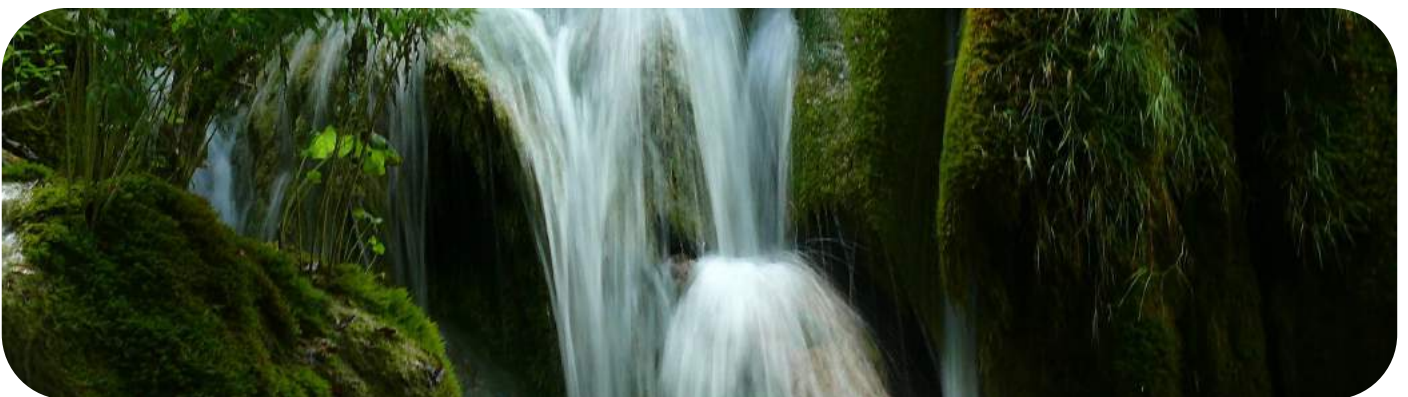
SUSTAINABLE ENERGY AND WATER

Mountains act as water towers for Europe, providing water to mountain and lowland areas (up to 30-60% of the water flowing to lowlands comes from mountains). The global increase in mean temperatures of 0.8 °C in the last 150 years (2 °C in some mountain regions), poses a particular threat to Europe's water resources in mountain areas where warm temperatures have caused glaciers to melt rapidly and where anomalous and unpredictable precipitation patterns pose a threat to the ability of lakes, reservoirs, glaciers, and seasonal ice and snow to accumulate and store water. Climate change's effects on water resources in mountain areas is also affecting the frequency of flooding and landslides and altering water quantity and quality.

Water from and in mountain areas supports agriculture and tourism, promotes biodiversity and forest growth, is used in energy production and industry, and is an important source of drinking water. Climate change therefore has the potential to affect all of these processes.

The consumption of fossil fuels has contributed to the global increase in mean temperatures and is a major driver of climate change. Existing alternative energy solutions in mountain areas include, for example, hydropower and forests, but there remains a need to develop additional alternative, renewable and low-impact energy solutions that can help mitigate the effects of climate change. Sustainable energy solutions should continue to be promoted in mountain areas as mountain areas will continue to be some of the regions to be hardest hit by climate change.

How can mountain areas innovate to save energy? How can they combine an integrated mix of renewable energies? How can water be better preserved, used and re-used?



A NEW GOVERNANCE APPROACH: HOW THE COMMUNITY OF TOLMIN, SLOVENIA HAS DEVELOPED AN ENERGY POLICY TO DEAL WITH CLIMATE CHANGE

Context

This project emerged from the idea that climate change could be seen as an opportunity for local/regional development, rather than just as a problem. The project believes that the local and regional level are the most appropriate scale of action due to the inflexibility often found at the national level. With the goal of turning the problem of climate change into a vehicle for local and regional development, **five municipalities in the Slovenian Alps** came together to **develop a Low Carbon Strategy** that would act as an umbrella document for future initiatives.



Project activities

In addition to the five municipalities involved in leading the development of the strategy, the project engaged interested stakeholders and the general public. The activities carried out for and after the preparation of the Low Carbon Strategy included:

- Motivation of stakeholders and holding of workshops to involve all concerned actors and the general public;
- Interviews with experts;
- Preparation of a regional Low Carbon Strategy based on input from five municipality councils.

Results

The most important part of the project was **the process**, which is still ongoing. A bottom-up approach allowed a diverse set of stakeholders to participate in the development of a Low Carbon Strategy document that would be supported by stakeholders across sectors. Some measures of this Low Carbon Strategy are the following: refurbishment of public buildings, micro and midsize long distance district heating systems powered by biomass, network of e-cars charging stations, multimodal car train transport option, GIS mapping of renewable energy sources potential.

As a result of the process of drafting the Low Carbon Strategy, two of the participating municipalities joined the European Covenant of Mayors for Climate and Energy (signatories pledge to implement EU climate and energy objectives in their territories) and Tolmin was declared the Alpine Town of the Year in 2016.

A very simple idea to draft a Low Carbon Strategy has developed into a brand that stakeholders are now using to justify their activities. As an outcome of the strategy, many interdisciplinary activities have emerged, for example the connection of organic farming with tourism supported by sustainable mobility based on low carbon principles and the reduction of overall energy consumption.



Multimodal car train transport

Innovative Aspect: This bottom-up approach turned the challenge of climate change into an opportunity.

THE USE OF GREEN ENERGY TO PROCESS BERRIES

Context

In northern Romania, green energy is rarely used due to lack of know how and minimal investment. At the same time, the forests in Romania's northern mountains contain non-wood resources such as wild berries, mushrooms, and herbs which require energy for processing in order to be sold on the market. To provide the energy for processing and to encourage green energy use in the area, the Mountain Farmers Federation "Dorna" (FAMD) of Romania together with Open Fields and the Norwegian Institute of Bioeconomy developed a **solar energy processing unit for wild berries, mushrooms, and herbs**. The unit now serves as a **model for green innovation** in the region.



Project activities

The project aimed to create a processing unit for **non-wood products that used green energy sources and produced certified non-wood products** that could be sold on the market. Non-wood products include berries, mushrooms and herbs.

The project also sought to raise awareness about how to effectively and responsibly capitalize on the non-wood resources that can be gathered from forests. In addition, the project aimed to expand knowledge among farmers of **the importance of managing non-wood forest resources** in accordance with environmental principles in order to ensure the sustainable management of forest areas.

Finally, the project provided the opportunity for local farmers to produce **certified products** that could be sold under a unified brand name: "AROMA MUNTELUI"/"MOUNTAIN FLAVOR". The project encouraged farmers to gain added value from their existing activities through diversifying their production and selling additional products on the market. By implementing a common brand name for non-wood products from northern Romania, the project promoted a system of dynamic control of the quality of the labeled products and is helping in the prevention of the chaotic exploitation of non-wood products.

Results

- **Purchase and installment of equipment for green energy production** (a photovoltaic plant with a power of 27.5 kW was installed) and of processing equipment;
- **Research study** on nutritional characteristics of forest products, optimal harvesting period and methods;
- **Good practice guide** on forest berries, products harvesting, and green processing;
- **Dissemination of good practices** through training for farmers;
- Dissemination and publicity activities to share lessons learned and **promote green energy use** and processing center activities.



Innovative Aspect: The project managed to develop a new brand for mountain products in Romania while ensuring the quality of the food and promoting green and sustainable energy production to process the products.

BIODIVERSITY AND PROTECTED AREAS

Changes to ecosystems caused by human induced climate change will continue to affect species frequency, distribution and survival. Mountains are particularly susceptible to biodiversity loss as many mountain species can survive only in limited climatic niches. In some mountain areas, warming temperatures have started to push species from lower to higher elevations. As temperatures continue to rise, the 20% of European plant species that live above the tree line may go extinct. The specific risks climate change poses to biodiversity in mountain areas will require unique policies and programmes, as those developed for less sensitive environments may have little success.

The European Environment Agency predicts that 60% of mountain species will be extinct by 2100 as to escape extinction, species would have to evolve 10,000 times faster than average evolution rates. Species in mountain ecosystems are intimately interconnected. The loss of even a single species can have cascading effects throughout the ecosystem. Ecosystems disrupted by species loss may become less productive, particularly during the transition period before new species fill in for lost biodiversity. It remains to be seen whether new species will fill emptied niches and at what speed. There is a need for activities that mitigate species loss and models that allow researchers and policy makers to predict where, when, and at what speed species loss will occur in different mountain environments. What might these models look like and how might they be used effectively?

Losses to biodiversity represent losses of reservoirs of information, for example about the evolution of life on earth and the medicinal properties of plants. People will be affected through the risks biodiversity loss poses to the sustainability of mountain landscapes, water and food resources, agriculture, and economies, as well as to human health. Initiatives that engage local actors in activities related to biodiversity mitigation and protection may be more successful. How can mountain residents be engaged to deal with the challenges climate change poses to biodiversity?



BETTER TO CONSERVE THAN REINTRODUCE. LESSONS FROM SPECIES REINTRODUCTIONS IN MOUNTAIN ECOSYSTEMS AND THE IMPORTANCE OF PERFORMING FEASIBILITY ASSESSMENTS: THE CASE OF THE MOUNTAIN GREY PARTRIDGE

Context

The reintroduction of former, recently extinct species in mountain ecosystems can fill vacant ecological niches, add complexity, promote stability or reduce functional redundancy, in so doing **improving the resilience of ecosystems to climate change**. Therefore, this restoration tool is being increasingly used. Here, we present **the case for the reintroduction of the Mountain Grey Partridge (*Perdix perdix hispaniensis*) in the Basque Country and Navarre in Spain**. The bird is a bird of the pasturelands and shrublands and disappeared from this region in the mid-20th century. Assuming that natural recolonization is not possible, due to the isolation of the surviving populations in the central Pyrenees and the Cantabrian mountains, the Provincial Council of Álava and the Government of Navarre, together with their public agencies Hazi Foundation and Gestión Ambiental de Navarra, analyzed **the feasibility of the reintroduction of this species through the project Gallipyr**, co-funded by the European Regional Development Fund (POCTEFA).



Project activities

During the project, partners:

- Selected optimal locations and habitats for the reintroductions;
- Identified the potential “donor” populations, either wild or captive, and tested their suitability;
- Acquired practical experience in capturing techniques, transportation and release of individuals;
- Performed a Population Viability Analysis (PVA) to detect the most influential drivers for the persistence of the reintroduced populations;
- Monitored small-scale attempts to release birds in order to provide the PVA real demographic data;
- Disseminated the initiative to groups of interest, mainly hunters, pastureland managers and conservation practitioners.



Author: Masquepajaros

Results

In this project, partridges from donor captive populations were used in releasing essays, but their survival was very low. To increase survival, behavioral adaptations at the captive breeding facilities and/or predator control at the releasing sites should be implemented. Practical experience suggests that it is difficult to achieve the proposed long-term objectives when reintroducing a population. It is worthwhile to analyze at a pre-project stage whether the programme is feasible or not, and which factors are responsible for success or failure.

Food for thought: It is much more cost-effective to implement actions to reverse the decline of remnant populations than to rely on restoration, once the target population is endangered, depleted or destined to go extinct.

PAYMENTS FOR ECOSYSTEM SERVICES IN NATURA 2000 SITES IN LOMBARDY

Context

Natura 2000 sites, the European Union wide network of nature protection sites, **provide ecosystem services ("ES") such as biodiversity and landscape preservation, healthy soils, water and flood protection, and public recreation.** These ES are essential for the socio-economic well-being of local populations. Raising awareness among both the public and policy makers about ES and their provision is crucial for the provision of good ES and in large quantity.

The LIFE+ **project Making Good Natura - LIFE11 ENV/IT/000168** ("MGN project") - in Italy, researched new possible ways of self-financing ES in 21 areas. The study framework features an ES-based approach which promotes **Payment for Ecosystem Services ("PES") and PES-like schemes** as a possible tool to **recognize the monetary value of ES while at the same time financing protected areas conservation measures.**

Project activities

In nine Natura 2000 sites located in four regional public forests in the Lombardy Region, a preliminary assessment featuring GIS-based analysis and the involvement of management authorities and local communities in a participatory process offered a comprehensive overview of the ES delivered by each site, highlighting the key ES at each particular location. The identified ES were later thoroughly assessed and valued. The results are being used by the different stakeholders in order to better recognize the ecosystem services provided by the mountain areas and to define possible PES schemes that identify stakeholders involved and the type and value of payments.

PES should be based on a voluntary transaction: one ES buyer pays for the provision of a defined service and the supplier guarantees provision of the ES. As an example, ERSAF chose to put on the market sustainable timber coming from the Lombardy Forests, and to allocate the revenues, paid by forest enterprises, to actions aimed at the upkeep of the forestry strategy.

Results

Several agreements have been put in place in order to pay for the provision of the ecosystem services provided, such as for wood, pasture or non-wood products. Some cultural services, such as the recreational use of land, have also been better recognized as ecosystem services and thus farmers and forestry owners receive payments for providing these services.

This regional model of management of natural resources in Natura 2000 sites in the Lombardy region in Italy can be transferred to other regions. Further scale-up of this action is already foreseen in not just four, but in most of the 260 Natura 2000 sites in Lombardy with the Life GESTIRE IP 2020 project.



Innovative Aspect: Payments for ecosystem services can ensure a better provision of services such as water and flood protection or healthy soils, services that are of particular importance in the fight against climate change in mountain areas.

FROM SNOW TOURISM TO A FOUR SEASONS TOURISM

Each year mountains welcome a large number of tourists: for instance, 95 million long-stay tourists and 60 million day-trip visitors visit the Alps every year. Climate change will continue to decrease the availability of snow for winter sports; will increase the risks of natural disasters, affecting transport infrastructure and settlements as well as the security of tourists; and will result in changes to water regimes and the attractiveness of the landscapes on which many aspects of tourism depend. At the same time, the growth in nature-based tourism that is so vital to many mountain areas may be under threat from climate induced biodiversity changes.

The development of sustainable forms of tourism in mountain areas is not only essential for the long-term viability of the tourist sector, but is also a way to meet new demands from European society and achieve smart, sustainable and inclusive growth (EU 2020), both for mountain communities and more widely across Europe's many regions. Our ambition, within mountain areas, is not to promote sustainable tourism as an alternative market in contrast to inter alia mass unsustainable tourism, but to encourage all mountain communities and businesses to adopt sustainable forms of tourism everywhere, in large-scale destinations as well as in small-scale destinations or in protected areas.

As snow tourism becomes more difficult to maintain, several tourist destinations will have to diversify their activities (for example through agritourism or summer activities) in order to be more sustainable and adapt to climate change.



A NEW ALTERNATIVE TO WINTER TOURISM: RECOVERING ALPINE PASTURES THROUGH THE PROMOTION OF QUALITY FOOD PRODUCTS

Context

Slovenian ski resorts are extremely sensitive to climate change due to their low altitudes. “Rogla”, as one of most popular ski resorts in Slovenia, is no exception. “Rogla” sits at only 1 517 meters and tourism is still limited to traditional ski activities. In the last decades, studies of Slovenian ski resorts show that the smallest financial losses are recorded in resorts with already existing lodging capacities and additional activities. Although at the “Rogla” resort some summer activities, such as biking and hiking, are starting to develop out of existing lodging capacities, **new innovative actions are needed to attract more tourists**. “Rogla” is one of the case studies for the ALPA project (EU Territorial cooperation – Operational programme Slovenia-Austria 2007-2013), which studied innovative solutions for sustainable management of alpine pastures in protected areas. **Action plans for recovering alpine pastures while promoting quality alpine food** aim to improve and/or maintain the socioeconomic status of farmers and to expand tourism.



Activities

- **Implementing an action plan for quality food from alpine pastures:** In the Rogla area, many farmers are active in alpine pastures. With these farmers, 20 different development plans for their alpine products (crop products, food products, services) were elaborated and finally a collective brand “**Tastes of Rogla**” was created.
- **Linking alpine pastures and food products, tourism and farmers’ income:** Tourist packages already offer guided tours of protected alpine pastures and alpine wetlands, including visits to nearby farms where “Tastes of Rogla” products are grown. In June and July 2016, 2 000 - 4 000 tourists attended the events organized in the area. In the upcoming months, educational workshops for future guides will begin. The guides will be able to implement different specific theme tours and promote the brand “Tastes of Rogla”.

Results

The main outcomes were:

- **Maintenance of alpine pastures with active in situ conservation and increase in different alpine farm activities** (food production, “Tastes of Rogla” brand, farm tourism)
- **Increase of farmers’ income.** Because of good networking, a common vision and successful support services, the response of alpine farmers has been very positive.
- **Increase tourist activity in summer time.**

In the long term, the use of an alpine pastures food label (Swiss “Alpage” labeling scheme or Alpine Convention proposal for “Alp” product) is anticipated.

Innovative Aspect: Relying on quality food from alpine pastures as a way to develop summer tourism.



DEVELOPING SUSTAINABLE TOURISM DESTINATIONS IN GEILO —CHALLENGES AND OPPORTUNITIES

Context

Geilo is a year-round tourist destination in the Hol municipality of Norway. In June 2016, Geilo received in the Certificate for Sustainable Destinations. It took years of work for Geilo to demonstrate its lasting social and environmental commitment to provide the best possible experiences for its guests, while keeping the negative impacts of tourism to a minimum. The destination must continually improve its business practices and relations with the local community, following principles of sustainability.



Project activities

More than 250 businesses, the local government, Innovation Norway and a great number of people were involved in the process of certification. Now that the first certification has been earned, re-certification will occur in three years. Before that, efforts to increase Geilo's sustainability must be made. The certification process has provided an anchor for the whole community, not just the tourism industry. It has become natural for the destination to work sustainably.

All activity providers are now environmentally certified in order to be able to offer responsible experiences to the conference market. The goal for the Geilo destination company, Visit Geilo, is also to have all the events in Geilo be environmentally certified. These events include the World Championship in kicksledding and the Norwegian Food Festival.

In Geilo, a special emphasis is put on people, landscape and culture. Private citizens can contribute to Visit Geilo as private members, a large photo documentation project has been undertaken, and the local administration has been involved in promoting the natural and cultural heritage of Geilo.

Results

Today, Visit Geilo is made up of 247 certified members. Better communication, more involvement, approaching a wider range of potential members and clear objectives have led to an increase of certified members. Working from a foundation in sustainability provides members room for a range of responsible actions. New markets have opened up, and a stronger identity and pride in the area's cultural and natural heritage have been fostered. The joint effort has been a way to attract more tourists to Geilo and to adapt the area's economic model to face future challenges.



Innovative Aspect: National certificate for sustainable destinations

Norway is the first country in the world that has launched a national certificate for sustainable destinations. The certificate is based on international criteria developed by the United Nations World Tourism Organization. Quality label «**Sustainable Destination**» is awarded to destinations that work systematically to enhance guest experience and reduce tourism's negative impact.



ACCESSIBILITY OF MOUNTAIN AREAS: DEVELOPING SUSTAINABLE TRANSPORT AND ICT

Accessibility and connectivity in mountain areas present a challenge to sustainable development. The particular geological features of mountain areas can make them difficult to traverse and render certain areas accessible only by car. Some mountain areas suffer from high levels of pollution from motor vehicles as a result of motor vehicle traffic. For example, due to limited alternative transport options, in the Alpine region trucks are used for the transport of materials across the mountains. Combined with local traffic and the alpine geology of high mountains, the pollution from motor vehicles can get trapped in valleys and have negative effects on fauna and flora and human health locally while contributing to larger processes of climate change worldwide. This problem is not unique to the Alps. Sustainable transport options (collective transport, on-demand, alternative transport) that increase the accessibility of mountainous areas are needed in order to improve the lives of people living in mountain areas, for example by reducing pollution, increasing economic opportunities, and facilitating movement.

Information and communication technologies (ICT) have the potential to be powerful resources in the mitigation of and adaptation to climate change. They can increase the connectivity of mountainous regions and, in so doing, reduce the need for people to commute in personal vehicles. ICT can be used to record data about the effects of climate change at local and national scales, to use that data to create knowledge that can be used to address the effects of climate change, and to communicate that knowledge to individuals and organizations at all levels. ICT can contribute to spreading information on good practices in adaptation and mitigation and information about the effects of climate change in local settings. ICT can also be used in warning systems and in the response to potential climate change challenges, including natural disasters. ICT, though, will be insufficient to completely understand and address the complex phenomenon that is climate change. There is a need for understandings of the strengths and limitations of ICT as well as the appropriateness of implementing a technology solution in a specific climate change scenario.



MICROPOL: IMPLEMENTING SMART WORK CENTRES IN NON-METROPOLITAN AREAS

Context

The Interreg IV C (2012-2014) MICROPOL project, coordinated by the North Denmark Region, had as its objective the deployment of work centres in rural areas of Europe, particularly in zones affected by rural decline and stagnant economic growth. The project sought to visit and collect experiences from existing teleworking centres (Smart Work Centres) across Europe, and to exchange expertise and good practices concerning implementation and management of all forms of teleworking in rural and suburban areas that have experienced a loss of human capital due to outmigration to urban areas.



Project activities

This project enabled the implementation and management of Smart Work Centres (SWCs), which include a desk set that offers space for individual workers or group work. Through the use of information technology, SWCs meet or improve all conventional work processes. By providing a physical working space near the home of employees, SWCs help reduce transport needs and costs and increase productivity.



Results

The project team produced:

- a matrix of different types of SWC,
- a collection of good practices related to SWCs in rural Europe,
- a sustainable business model and a practical guide for local communities who wish to establish their first SWC,
- a comparative analysis of SWCs across rural Europe,
- policy recommendations and improved policy instruments,
- a Social Return on Investment study of existing local SWCs which showed various positive social, economic and environmental impacts of SWCs,
- an example questionnaire designed to assist local authorities and communities in evaluating the potential social, economic and environmental benefits of SWCs,
- finally, MICROPOL produced a film about the project. It can be found on YouTube: https://www.youtube.com/watch?v=H_Z8 TEhYjY. An additional film was made specifically about the Lormes SWC: https://www.youtube.com/watch?v=2A_Vtgk7hVk&feature=youtu.be.



Innovative Aspect: ICT and teleworking are used as economic and sustainable tools to remove geographical boundaries and create digital jobs in rural areas. They reduce commuter transport and thus reduce the CO₂ emissions emitted while going to work.

MOVE ON GREEN: IMPLEMENTING SUSTAINABLE TRANSPORT IN RURAL AND MOUNTAIN AREAS

Context

Policy makers and other actors in mountain areas recognize that sustainable mobility schemes are critical to effective development strategies. Any attempt to address issues of access to education, population decline, promotion of tourism, or economic development will be futile without a sustainable transport plan that increases the connectivity of mountain areas while keeping greenhouse gas emissions low and preserving the environment. The particular geography of mountain areas, though, makes sustainable transport a challenge. The Interreg IV C Project Move on Green (2012-2014) sought to address this challenge.



Project activities

The project had four objectives:

- Reduce emissions and waste and minimise the impact of transport on both the environment and local landscapes.
- Allow the basic needs of individuals and society to be met safely and in a manner consistent with human and ecosystem health.
- Support competitive economic options as well as balanced development in rural areas.
- Offer a number of transport alternatives which are affordable and operate efficiently.

The 13 project partners made field visits, developed a collection of 51 Good Practices, and wrote policy guidelines on sustainable transport in rural and mountain areas. Each regional partner developed an action plan on sustainable transport to implement locally based on new solutions discovered through the project.

Results

Of particular interest are the solutions discovered regarding transport on demand, cycling, and multimodal transport that have a direct impact on the reduction of CO2 emissions.

In Brandenburg (Germany), in addition to passenger transport, scheduled service buses (Kombibus) are also used to transport goods using available luggage space. If a low-entry bus is used, the freight is transported in a trailer. In Teruel (Spain), the Sagunto community has made short-term electric vehicle rental available at the price of a bus fare. In Hungary, intermodal transport facilities have been developed including park/bike and ride systems, integrated bus and train timetables, and new pedestrian bridges over railways. In the nine provinces of Castilla - Leon, the transport on demand cluster in rural areas provides on-demand transport services for inhabitants living in small isolated areas. Examples of cycling solutions include the netbike system in Austria that offers a network of bike rental stations at railway and bus stations where bikes can be rented at low cost. These different examples have been transferred to other countries and integrated in to regional plans.



Innovative Aspect: Developing a regional sustainable transport plan dedicated to rural mobility and compiling a series of sustainable transport solutions both of which are used for the benefit of people and the environment.

INNOVATION LINKED TO THE MANAGEMENT OF NATURAL HAZARDS

Climate change increases the frequency and the strength of natural hazards in mountain areas. Heavy rainfalls lead to floods and landslides, very dry periods lead to fires and the loss of crops and animals, and heavy snowfalls cause avalanches. Changes in local weather patterns alter biodiversity with potentially cascading effects on pest infestations and plant disease rates. In the face of these challenges, creative mitigation and adaptation efforts will be important in order to minimize environmental, economic, and societal impacts. There is the need for innovative approaches to natural hazard management, from prevention through to response.

In mountain areas, the threats from climate change are exacerbated by often difficult environmental conditions such as steep terrain and high altitudes which can intensify the natural hazard and make it harder to reach zones that have been affected. Though some mountain regions are already equipped to deal with natural hazards, climate change has the potential to change the frequency, intensity, and nature of these hazards in ways that will require innovative solutions to avoid negative outcomes. Mountain regions experiencing demographic changes such as out migration and an ageing population are especially vulnerable. Understanding these specific vulnerabilities will be important when designing initiatives to address hazards.

Natural hazards can be mitigated through effective forest management. In the Alps, 63% of Bavarian forests serve a protective function against soil erosion and 42% against avalanches. In Switzerland, forests protect against avalanches. Without them, it would cost the government more than \$100 billion to build permanent structures to protect against avalanches.

Technology can also be used in the management of hazards, for example through early warning systems. In Slovenia, detailed hydrological models have been developed to forecast floods. These are linked to a mobile phone application that warns people of impending flooding.



LAND-USE PLANNING AND PHYSICAL INFRASTRUCTURE: PLANNING FOR INCREASED OR DECREASED CLIMATE CHANGE VULNERABILITY?

Context

There has been an observed increase in weather related natural hazard damage on physical infrastructure in mountainous regions of Norway. These changes come in two categories: 1) **“More of the known risks”**: Changes in extreme weather events (e.g. extreme precipitation, resulting in flash flood incidents); and 2) **“New vulnerabilities”**: extreme changes in normal weather situations (e.g. extremely long periods of moderate rain, resulting in increased risk of mud-slides). At the same time, the pressure to develop new physical infrastructure (like roads, residential buildings, etc.) is high, economic constraints on maintenance budgets are increasing, and institutional capacity in land-use planning is decreasing – **all in all resulting in an increase in climate vulnerability of physical infrastructure.**

Project activities

1. Identification of major natural hazard events that have caused damage to physical infrastructure.
2. Analysis of whether or not “bad planning” and/or “bad maintenance” could partly explain the nature and extent of damage instead of “climate change” in the cases identified in (1).
3. Analysis of the extent of and calculation of the costs of “repair” measures versus “climate change adaptation” measures that have taken place in the cases identified in (1).
4. Development of suggestions to improve land-use planning on the basis of the findings in (2) and (3).
5. Analysis of ongoing land-use planning processes that involve weather related natural hazard events in relation to suggestions developed in (4).

Results

Although many improvements have been made in land-use planning in order to reduce weather related natural hazard events, “bad planning” is still a major contributor to producing climate change vulnerabilities. Thus, a number of suggestions have been made regarding how to improve the quality of land-use planning in order to reduce climate change vulnerabilities.

Innovative Aspect: Identifying the degree to which bad infrastructure, climate change, or a combination, contribute to natural hazard damage allows for better risk management and more focused infrastructure development and land-use planning.



“More of the known risks”: The October flooding incident in 2014 at Voss, Hordaland county, Norway



“New vulnerabilities”: A forest fire took place during winter time in Northern Norway after a long (2 months) period of drought, when the ground should be covered by snow

FORRISK AND PLURIFOR : INNOVATIVE RISK MANAGEMENT IN BASQUE FORESTS

Context

Forests are an increasingly essential resource for territorial development and will be crucial for achieving European objectives surrounding emissions control and carbon fixation. Forests contain high levels of biodiversity, improve the quality and provide large quantities of water, are a prominent feature of the landscape, and are subject to many public use activities. However, the threats to forests are numerous. The uncertainties and risks associated with climate change could lead to a massive loss of forests in the next 50 to 100 years. The Interreg SUDOE IVB FORRISK project (2012-2014) brought together research institutes, universities, technical institutes, advisory services, and NGOs to make recommendations for the integrated management of current and future risks to forests located in the Atlantic Arc (Portugal, Northwestern Spain and Southwestern France).



Project activities

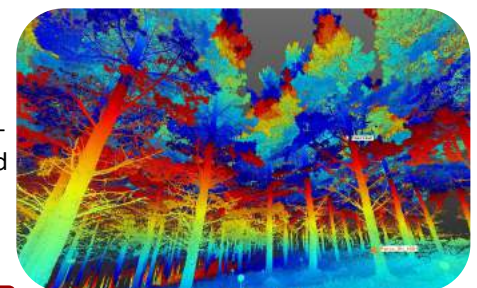
The project's goal was to take a first step towards developing an integrated risk management model for European forests. The project recognized that institutional and legal barriers exist that prevent the diffusion and implementation of risk management solutions and so identified a range of actors involved in risk management and actively promoted and disseminated good practices.

The project pursued **three** general lines of inquiry:

- **Institutional tools of risk management** – Conducted analysis of institutional tools present in each region, compared systems, and suggested improvements.
- **Risk management** – Tested innovative methods in risk management, for example: experiments on timber species that can act as protective species against biotic risks to forests, tests on specific plots of forest land, and tests of genetic material that could be used to reconstitute a forest or make it more resistant.
- **Risk analysis and decision support tools** – Conducted a risk and vulnerability assessment and developed recommendations for risk prevention and control. Based on new forest technologies (LiDAR, laser 3D), the project developed modeling and decision support tools as well as maps of areas most exposed to hazards such as wind, fire, and erosion. These maps are useful for forest managers who want to adapt their practices and techniques to specific local conditions.

Results

FORRISK demonstrated that integrated risk management is possible and necessary and allows forest management to be adjusted quickly to changing conditions. Risks must be analyzed from many angles so that risk outcomes can be anticipated, prevented, and, if necessary, fought. To achieve success requires the cooperation of many actors and collaboration between institutions. The project has organized inter-regional workshops on risks, held panel discussions, started a website, and published technical sheets, management manuals, summary documents and scientific articles of their findings. Most of the project partners are now working in the continuation of the FORRISK project: the new SUDOE PLURIFOR (2016-2019).



Radiata pine forest measurement by 3D-laser scanner

Innovative Aspect This project showed how research and practice can be effectively combined to manage risks to forests.



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