The protective function of Alpine mountain forests

Mountain areas in general are strongly affected by natural hazards: avalanches, landslides, rockfall, erosion, torrent activity, floods. Compared to other mountain areas the Alps are characterized by a high population density and by important infrastructures (transport, tourism, production) and therefore hazards constitute a major risk for human activities.

At the same time, the Alps have a very long history of human settlements and are inhabited by a rich society. This has brought to the development of a solid concept of risk management in the alpine countries, based on the recognition of the natural hazards, and on the actions to improve resilience and defence against them (risk avoidance, technical and biological measures, alert and civil protection) in an INTEGRATED RISK MANAGEMENT.

In this comprehensive approach, mountain forests play an important role: because they actively protect against avalanche detachment, can stop rockfall, prevent erosion and form deep soils that reduce runoff; and because of their large extent in the steep slopes around human settlements and infrastructures.

In the past the focus was on a general protection of mountain forests, which was strengthen after major flood and torrent catastrophes in the second part of the 19th century (France, Austria, beginning of the 20th century Italy), leading to the constitution of special agencies for technical measures and to forest laws to protect and improve forest cover. Currently, the attention has turned to identifying and modelling of natural hazards and considering the relation to damage objectives.

Studies have been conducted to assess the effectiveness of the protective function of forests: obviously, the protection that forests grant has natural limits and in some conditions must be integrated by technical measures. Forest planning is called to verify forest functions and forest management to develop strategy to maintain and improve the protective function. These strategies usually imply higher costs for the owners so forest policy has the task to provide adequate funding to assure that protective forests are maintained in a healthy and stable condition and in case of heavy damages are quickly rebuilt.

PROTECTION FUNCTION AND WOOD PRODUCTION

The protective function does not exclude tree felling and wood production. More than this: the protection forests must be tended and maintained in a healthy and balanced condition to optimize their protective functions. The protective function is maximised by mixed tree composition, vertical structure with 3 layers, formed by trees of different ages in a dynamic balance, with continuous soil cover in time and with sufficient natural regeneration of the trees. To create/maintain such conditions human intervention in form of tree felling and wood harvest are necessary: the tending requires professional knowledge and attention to guide the evolution of the forest. Usually this implies less intensive cutting with higher costs: wood harvest must be carried out avoiding damages to soil and forest (often it implies cable crane, which is more expensive). Often natural evolution of the forest goes toward mature structures with larger proportion of old (less vital and stable) trees, possibly with structure simplification over longer periods. Unstable trees can cause damages to infrastructures and in case of floods activate debris flow and torrent activity. In protective forests, management and monitoring are necessary; wood production is usually compatible but more expensive: in some cases, trees are felled to regenerate the forest but not harvested to maintain a temporal protection through the roughness of the terrain: these very particular measures are financed by the state or by the beneficiaries of the protection.

There is no common definition of protective forests in the alpine countries and regions: each one applies different regulations and definitions and therefore the area identified with protective functions differs meaningfully from country to country. Nevertheless, in every country and region there is a general recognition of the essential importance of the protective function of forests.
In between, few projects have dealt with the protection function of forests:
- Interreg III A 2000-2006 "Gestion durable des forêts de montagne"
- Alcotra 2007-2013 "Forêts de protection : techniques de gestion et innovation dans les Alpes occidentales "
- Progetto Interreg IIIC "Network mountain forest"
- NESBA - Progetto Interreg Italia – Austria: malghe Schutzwald / boschi di protezione
- In 2009 the Arge-Alp project dealt with the "Ecology and Economy in Protective Forests"

An additional difficulty is that the area where mountain Alpine forests are defined and considered does not coincide with the area of the Alpine convention: consequently, there is no accurate data available specifically for the area of the Alpine Convention: national delegations provided data making some adjustments and estimates from existing data.

The task of the WG is to collect information and data on definition, mapping, management objectives, projects and subsidies to improve the protection function of mountain forests in the Alpine area.

In many countries and regions there is a trend to define protective forests linked to different natural hazards: rock- and stone-fall; avalanche; landslide; torrent activity and debris flow. Therefore, many/some countries/regions define two types of protective functions

- **Object protection forest**: directly interlinked with the existence of objects (housing, buildings, infrastructures) to be protected from natural hazards damages;
- S**ite-protection forests:** designated for forest stands with ecological sensitive soil conditions at the upper and lower timberline, where the regeneration is problematic, where the economic exploitation is difficult/impossible and only allowed under specific requirements.

Italy

In Italy, there is a very broad conservation issue of forests linked to their protective function (**hydrogeological protection**, going back to a 1923 national forest decree): 89% of the forest area in the Alpine regions is under this kind of protection that implies that land use change must be authorized, regeneration guaranteed and management controlled (Fig. 1). The rational of this regulation is that all forests in the hydrological protection area have a protective function (priority) while only a part of them has also a productive (economic) function.

forest area subject to hydrogeological protection	
Piemonte	83,90%
Valle d'Aosta	80,80%
Lombardia	82,90%
Alto Adige	98,10%
Trentino	98,70%
Veneto	95,30%
Friuli V.G.	85,70%
Total	**88,60%**

Fig. 1: Italian Alpine Forests: Hydrogeological protection area.

There are no specific data available for forests in the alpine area: the national delegation used data of the seven Alpine regions where most of the forests are in the mountain (Alpine) area (Fig. 2).

Percentage of forest area subject to hydrogeological protection is between 81% and 99%.

Italy has not identified forests with direct protection function but the National Forest Inventory has data on slope, elevation and presence of instability phenomena that are indications of protection function.

	slope >60%	*elevation > 1500*	*instability*
Piemonte	26,41%	11,90%	19,40%
Valle d'Aosta	32,34%	59,40%	24,80%
Lombardia	37,49%	13,00%	14,60%
Alto Adige	39,53%	42,90%	21,90%
Trentino	37,70%		14,10%
Veneto	27,54%	16,60%	19,50%
Friuli V.G.	29,84%	6,00%	15,90%
Total	**28,97%**	**21,00%**	**17,90%**

Fig. 2: Italian Alpine forests: slope over 60%, elevation over 1500 m asl and area with instability.

Lombardy, Veneto and Friuli Venezia Giulia have a definition of protective forests:
- forests on cliffs or costal dunes
- forests on natural risk prone terrain (high inclination, areas subject to erosion, avalanches, rockfall)

Valle d'Aosta, Lombardy and the autonomous provinces of Bolzano and Trento have tools to identify protective forests (in planning).

Austria

Austria has defined in his forest development plan (Waldentwicklungsplan - WEP) four main functions for its forests: economic, protective, welfare, recreation. The WEP is anchored in § 9 of the forest law 1975. Its target is the delineation and a foresighted planning of the forest functions and has to be elaborated by considering any public relevant interests according to forest spatial planning. For each functional area, any of these four function is indicated (Fig. 3). The economic function is thereby interpreted as the precondition for any of the other three functions. Only in the case that any of those three functions "protective, welfare or recreational function" is highly dominating, the economic function changes. According to this approach, the protective function is prevailing on 30% of the forested area in Austria. These areas are mainly located in the Alpine arc.
The Forest Act identifies 2 functions
- site protection: forests on sand and drift soils, threaten by erosion or landslides, on sites where regeneration is very difficult (forests towards timberline, poor soils)
- object protection: humans, settlement, facilities, cultivated soils against natural hazards

Both of them grant a more stringent regulation to enhance the protective function.

20,5% of the Austrian forests other than OeBF (state forests) have a protective function; approximately half of them have a direct protection function (9.7% of the non OeBF forest area).
The protective status does not prohibit any economic usage in Austria. The average Growing stock of protective forests in Austria with 283 m³/ha does not differ much from the average for all forests: 286 m³/ha). Only the amount of timber harvested averagely in protective forests per year differs with 3.8 m³/ha significantly from the average for all forests: 5,0 m³/ha.

There are specific subsidies foreseen to maintain/enhance the protective functions of forests:
a) National project Protection through forests initiative (ISDW) since 2007
b) Rural Development Program's measure for Object Protecting Forests, based on silvicultural actions, knowledge and networking promotion (6 Mill €/year)

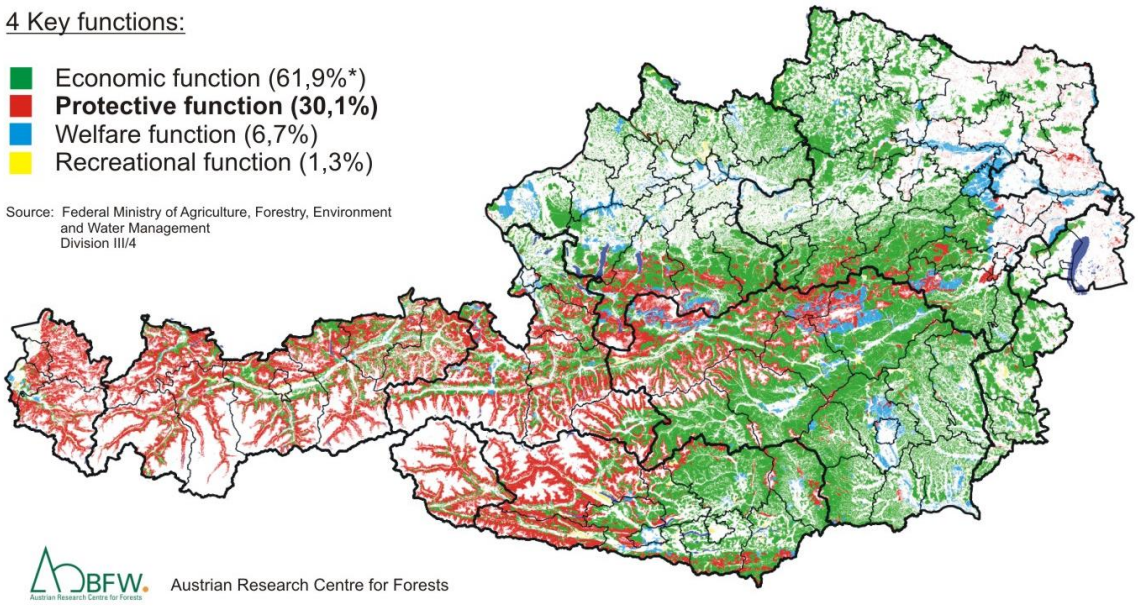


Fig. 3: Austrian Alpine forests: key functions of forests.

Germany

Germany has only a small part of the area of the alpine convention. It is situated only in the federal state Bavaria. Bavaria has defined a geographical Alpine area that is considerably smaller than the area of the Alpine Convention. Data on mountain forest are referred to the Bavarian Alpine area
The forested area in the German Alpine area is 50%.
Mountain forests in Bavaria are 250 000 ha (approximately 10% of the total forested area of Bavaria); protection forests are 58% of the Mountain Forests (approx..150.000 ha).
In the composition conifers prevail (70%) with spruce representing 61% of total volume (Fig. 4).
Public ownership is 66%, with 57% represented by state forests (Fig. 5).
The Bavarian Forest Act states, that mountain forests should as possible fulfil all functions over the entire area, in particular production functions (e.g. wood production), protection functions (protection against natural hazards, protection of water, biodiversity) and recreational functions.
Legal definition of protective forests (Bavarian Forest Act):

- Located at higher elevation or mountain ranges or
- Site with erosion risk or
- Preventing natural hazards as avalanches, rockfall, floods etc.

The Bavarian Forest Act also provides special regulations for protection forests, for example against land use change (clearing) and regulation of management (no clear-cuts).

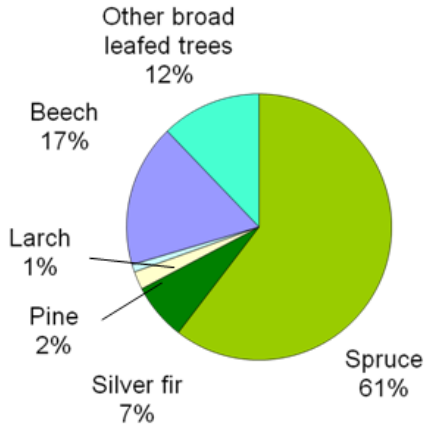


Fig. 4: German Alpine forests: Composition.

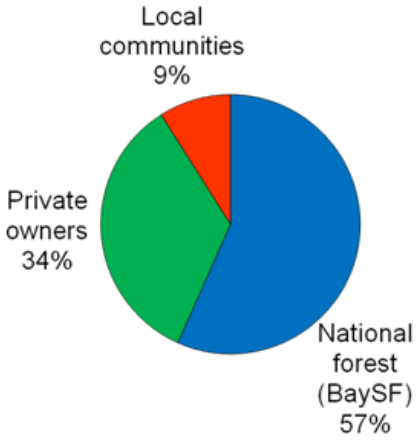


Fig. 5: Ownership of German Alpine forests.

There is a **financial support** for private and communal owners of mountain forests with a special focus on for maintaining the protective functions. Annual subsidies are about 2.9 Mio € per year. It includes special measures as

- road-construction
- logging with cable cranes
- planting of deciduous and mixed stands
- established natural regeneration
- tending in young stands
- prevention of bark beetles

Since 2005, the national forests can benefit of subsidies for special measures in protection forests (road building, prevention of bark beetles, planting, tending in young stands) too. This regulation was also integrated in the Bavarian forest law. The annual subsidies are about 1,8 Mill €/year.
Protection forests that are endangered to lose their protective functions or have lost it yet are maintained with a special **program for restoration of the protection forests**. The program is under direct responsibility of the Bavarian Forest administration. The annual investment is about 2,8 Mill. €/year.
Scientific research in order to improve the protection function of the forests is also important for Bavaria. For example, the INTERREG co-financed projects SICCALP and STRATALP dealt with the effects of loss of humus in succession of wind throws in the Northern Limestone Alps and developed strategies to prevent negative effects.
The projects were performed together with partners in Austria (http://www.hswt.de/forschung/forschungsprojekte/wald-und-forstwirtschaft/stratalp.html).

Switzerland

Switzerland has important projects on protective forests

- silvaProtect.ch (http://www.bafu.admin.ch/naturgefahren)
- NAIS (Sustainability in Protective Forests)

The protection function is related to natural hazards (rock fall, avalanches, landslides, torrential processes).

Fig. 6: Switzerland Alpine forests: the Silva Project web site.

Based on national criteria the area relevant for each hazard's source has been defined for whole Switzerland: the percentage of this area for each canton is protective forests index. This is higher in the Alpine core area (Graubuenden, Ticino, Vallaise, Berner) as shown in the graph of Fig. 7.
The index is the base for provision of subsidies for protective forest management to the cantons (60 Mill CHF/year).

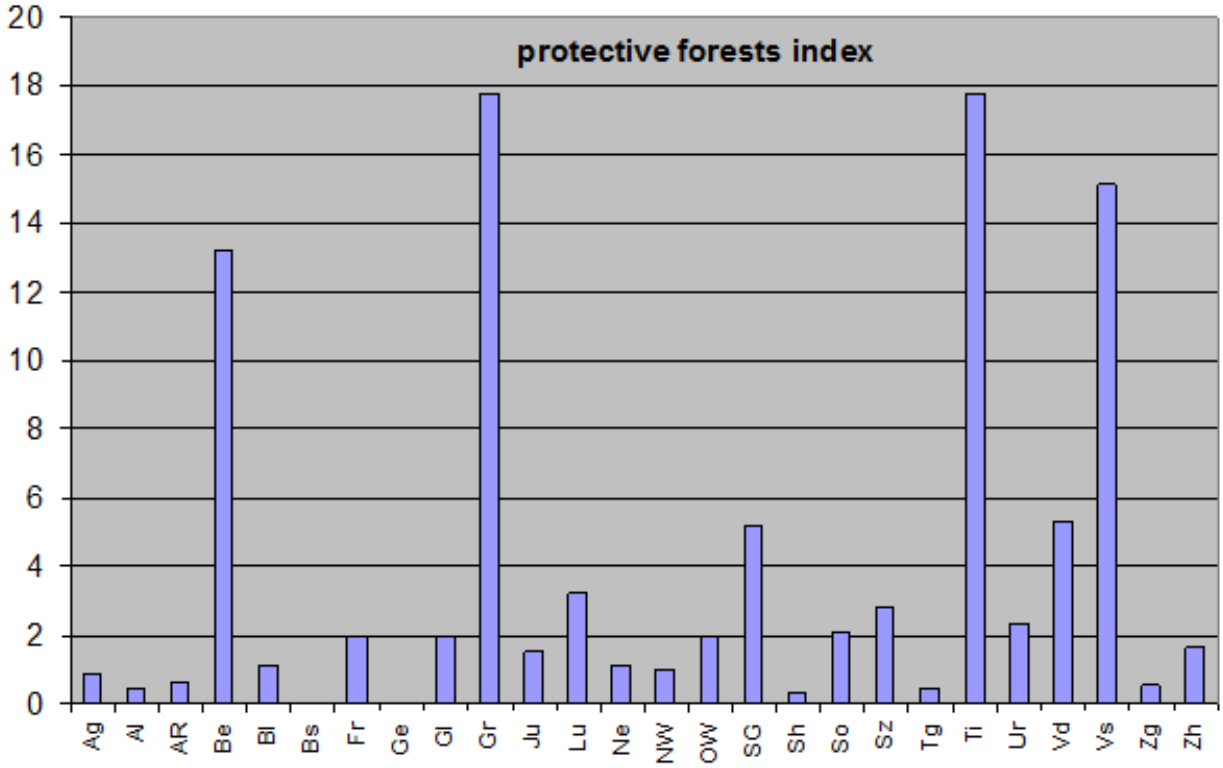


Fig. 7: Switzerland Alpine forests: Percentage of cantos' territories under the protective forests' index.

Additional 40 Mill CHF are provided for technical protective measures based on risk potential and needs.

Forest with a direct protection function has been defined in the whole Switzerland and is 49%.
The percentage of forest related to each cause is
- 8% rock fall
- 21% avalanches
- 27% landslides
- 80% torrential processes

Sum is bigger than 100% because areas related to different phenomena overlap.

Subsidies are given to owners to improve the protection function, according to specific criteria for each kind, and the condition of the forests (composition, age structure, regeneration).

The percentage of protective forests is very different in the cantons, up 90% in Ticino and Valais. As expected Alpine cantons have a higher percentage of protective forests (Fig. 8).

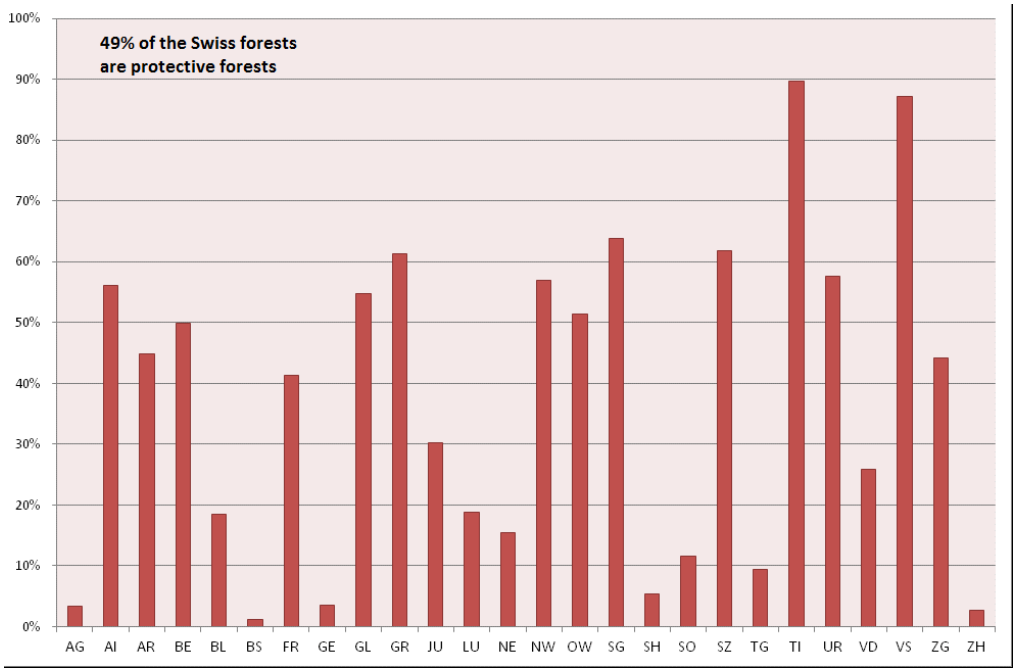


Fig. 8: Switzerland Alpine forests: Percentage of protective forests in each cantos' territories.

France

Most protective forests are **site protection** forests against erosion and landslides.
Protection areas are identified on the most risk-prone areas.

At national level
Protection areas: 1.238.000 ha (2,3% of the land area). Mostly mountains (Alps and Pyrenee); and costal dunes
964.000 ha are forested (78% of protection areas).
Forests in protection areas are 6,3% of the total forest area.

Management of protection areas
On 404.000 ha (33%) the only object is protection; on the rest protection and production.
258.000 ha (63%) of the only protective areas are forested.

Since 1860 a program to buy, restore and develop degraded areas in mountain areas has been in place: **Restauration des Terrains en Montagne (RTM)**

RTM manages 205.000 ha in the French Alps and has a yearly budget of 5 Mill €.
50% is forested
25% with non-forest vegetation
25% bare land

The areas are in the upper Alpine zone and access is usually a problem. Management is focused on maintaining/improving protection.

Water quality protection
200.000 ha forest are in drinking water reservoir protection zones (within landscapes with special conservation regulations) (1,3% of the forest area);
600.000 ha within mineral water spring protection zones (where no special forestry requirements are in place) (3,9% of the forest area).

Direct protection
Protective forests against rockfall, avalanche, landslides and debris flow have been designed.
Under the forest law, they have to be conserved and management and logging are are subject to special regulations.

In the French Alps (total forest area: 1.446.000 ha) direct protective forests are 136.100 ha (9,4%). A study in 3 small alpine catchments showed that the direct protection area varies between 20 and 47% of the forest area.

Liechtenstein

Due to amended claims on forests within the society, the forest function mapping has been revised in 1993. Besides the pure timber production, a number of additional forms of usage have been defined. Passive usages as protective function, wellfare function or protection of nature and territories were equally considered as active ones such as recreational function. In these days, forests need to cover a wide range of tasks. Therefore every of the more than 3,800 forest stands in Liechtenstein have been linked to a priority function, setting the main direction for future treatments.
The function mapping resulted in the following spatial and proportional distribution of functions:

Very Important Protective Function: 10%
Important Protective Function: 17%
Common Protective Function: 29%
Timber Production: 25%
Protection of Nature and Territories: 18%
Recreation and Welfare Function: 1%

The topography of Liechtenstein leads to a high share of forests with a protective function against natural hazards (56%). Regulated by law, the state covers all the expenses for management interventions to maintain and enhance protective forests (Fig. 9).
Only a quarter of all stands are focused on timber production and 18% are determined as special forest reserves and protected by regulation.

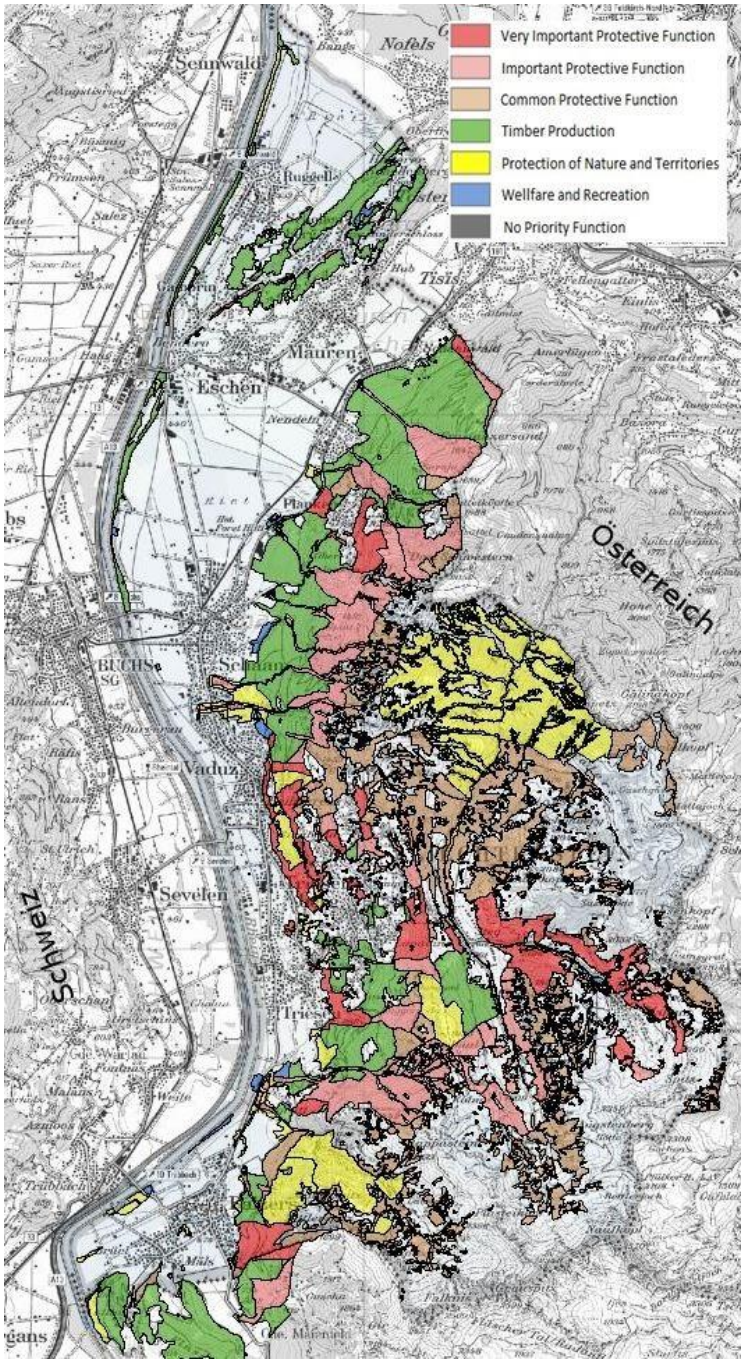


Fig. 9: Different protection function of Liechtenstein forests.

GOOD PRACTICES

Germany: Project Mountain Forest Offensive (BWO)

Almost 60 percent of Bavaria's mountain forests in the Alps are protection forests. These forests are increasingly endangered by the global climate change. With a broad measure package, Bavaria has increased its efforts for the preservation of multifunctional mountain- and protection forests. According to the mountain forest protocol of the alpine convention the implementation of the BWO is put forward together with concerned stakeholders.

The Mountain Forest Offensive ("Bergwaldoffensive" – BWO) is a part of a widespread program of the Bavarian state government against the global climate change. Since 2008, the Bavarian state government is financing the BWO with about 2.5 million euro per year. The measures of the BWO are specially designed for private and communal mountain forests, where the size of the single properties is usually very small.

The central part of the BWO are the so-called "BWO-projects". These are specially identified areas with an elevated risk for degradation as a function of climate change. In those areas together with different forest owners measures for maintenance and adaption of the forests are set into work. Examples for the measures are planting of adapted tree species, tending with the special aim of supporting adapted tree species, natural regeneration, logging with cable crane or building of new forest roads (Fig. 10).

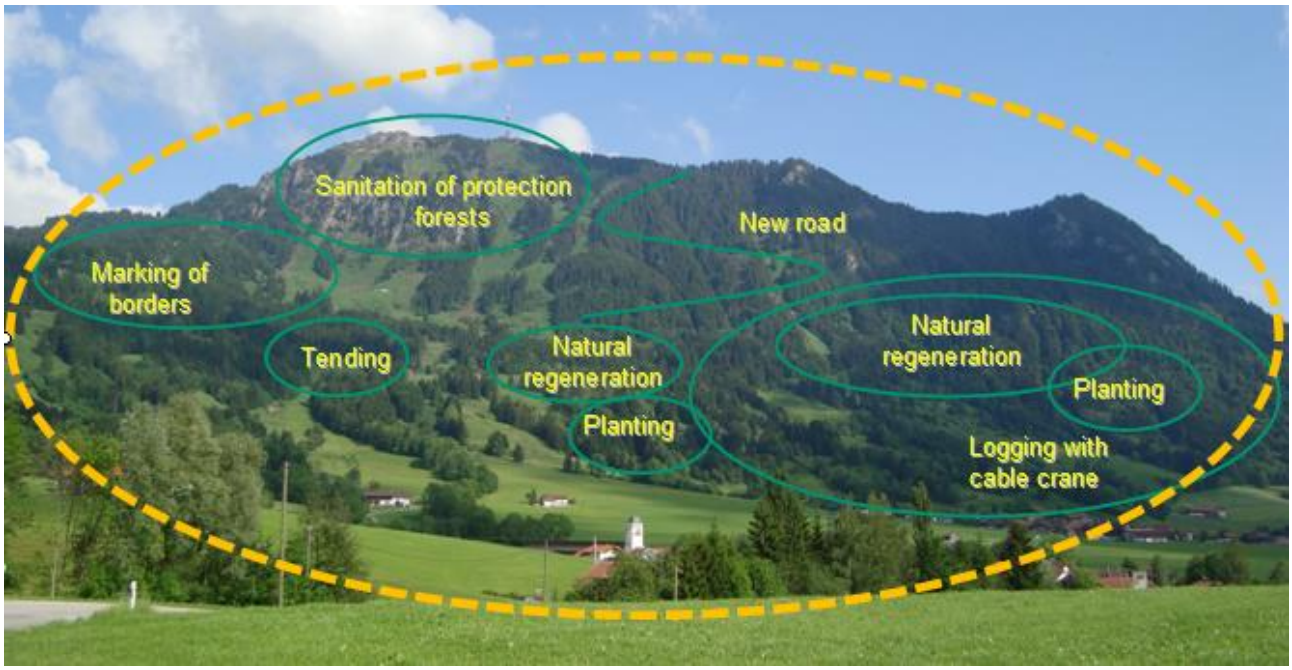


Fig.10: Schematic picture of a BWO-Project in the Bavarian Alps.

The local forest authorities are planning the single measures, setting them into action together with the forest owners. Putting together different owners is increasing the efficiency and reducing the costs. A project manager of the local forest authority is taking care of the BWO-projekt from the planning until the completion and is a contact person for forest owners and stakeholders.

Besides the process of integral planning participation is an important part of the programme. Therefor all concerned persons get the possibility to bring in their ideas from the beginning of the selection of project region, the planning process until the implementation of the single measures. In

general, a so-called “BWO-advisory board” is founded for the BWO-projects. The members of the advisory board are differing in each project area. In general, they are consisting of politicians, deputies of the forest owners, local authorities and other organisations (for example hunters, farmers, conservationists). We regard the BWO-advisory board the central factor of the success of the BWO (Fig. 11).

Fig. 11: The BWO-advisory board is discussing the regeneration of protection forests in a BWO-project.

Beside the BWO-projects, several other actions are part of the BWO as a program for the adaption of mountain forests to the climate change:

- **Adapted seed sources**: Forest regeneration, whether natural or artificial, is based on the utilization of forest genetic resources (i.e. seeds). The selection of suitable forest reproductive material has assumed a new importance both because trees are long-lived species and because rapid climate change will have an impact on the environmental conditions of the trees as they grow and mature. This counts especially for the Alps, because global warming will affect mountain areas in a particularly severe way, posing a very serious threat to Alpine forests. Adaptation to these novel environmental conditions is nearly impossible without genetic diversity. Therefore, the Bavarian Office for Forest Seeding and Planting (ASP) established a project to identify site adapted seed stands in the Bavarian Alps and to improve an adequate supply with seeds of high genetic quality.
- **Information on mountain forest sites**: whereas for the lowlands of Bavaria there are existing detailed forest site maps, no such maps were existing for the alpine region for a long time. As part of the BWO together with partners in Austria the project WINALP - ‘Forest Information System for the Northern Alps’ (www.winalp.info) developed intermediate-scale maps of the potential natural forest vegetation for the Northern Calcareous Alps, which are based on the ecological gradients temperature, soil reaction, and soil moisture. The project was financially supported by the European Fund for Regional Development (EFRE) within the ‘INTERREG Bayern – Österreich 2007–2013’ program.
- **Research**: although research findings show, that the alpine region will be increasingly affected by the global climate change, there are many questions on the effects of climate change on forests. Therefore in the frame of the BWO Bavaria also intensified research on the effects of climate change on forests (see projects SICCALP and STRATALP cited in the German part of the paper on protective forests)

With the BWO Bavaria is increasing its efforts for the preservation of multifunctional forests in the Alpine region. We hope that it will help to save the mountain forests as areas for recreation, biodiversity, wood supply and other ecosystem services for the coming generations.

Italy, Autonomous Province of Bolzano/Bozen: identification of protective forest in South Tyrol, Italy

In 2008 the Autonomous Province of Bolzano conducted a study to identify the protective function of forests against natural risks: avalanches, rockfall, debris flow, floods (Provincia Autonoma Bolzano: Schutzwald Hinweiskarte Suedtirol (Redaktion: A. Zischg, A. Largiader, ABENIS AG).

The province is an entirely mountainous area (100 % within the Alpine Convention), has a forest cover of 50% (National Forest Inventory 2005) that protect villages and essential infrastructures (transportation, tourism, production). Object of the study was mapping of the protective forests.

The study was based on an automatic GIS proceeding for each danger's source (first tested in some basins than extended on the whole area). The results were then checked on local conditions; in the final stage the actual protection of buildings and important infrastructures (using the categories of the flood risk plan) were defined (**object protection forest**) in order to receive the priority attention in the planning and management process; all forest with protection function (including object protective) were defined as **site protection**. The total area to be protected is 318,5 km² (4,5% of the province).

Avalanche protection: the model calculated potential avalanches in absence of forest (based on the digital terrain model: slope, elevation, morphology; and meteorological data); for the detachment area trajectories have been calculated, testing results with real avalanches' data. For all avalanches trajectory a deposition area has been simulated. The potential avalanche area was overlapped with the forest map and with the damage potential map, defining the object protection and the site protection forest (Fig. 12).

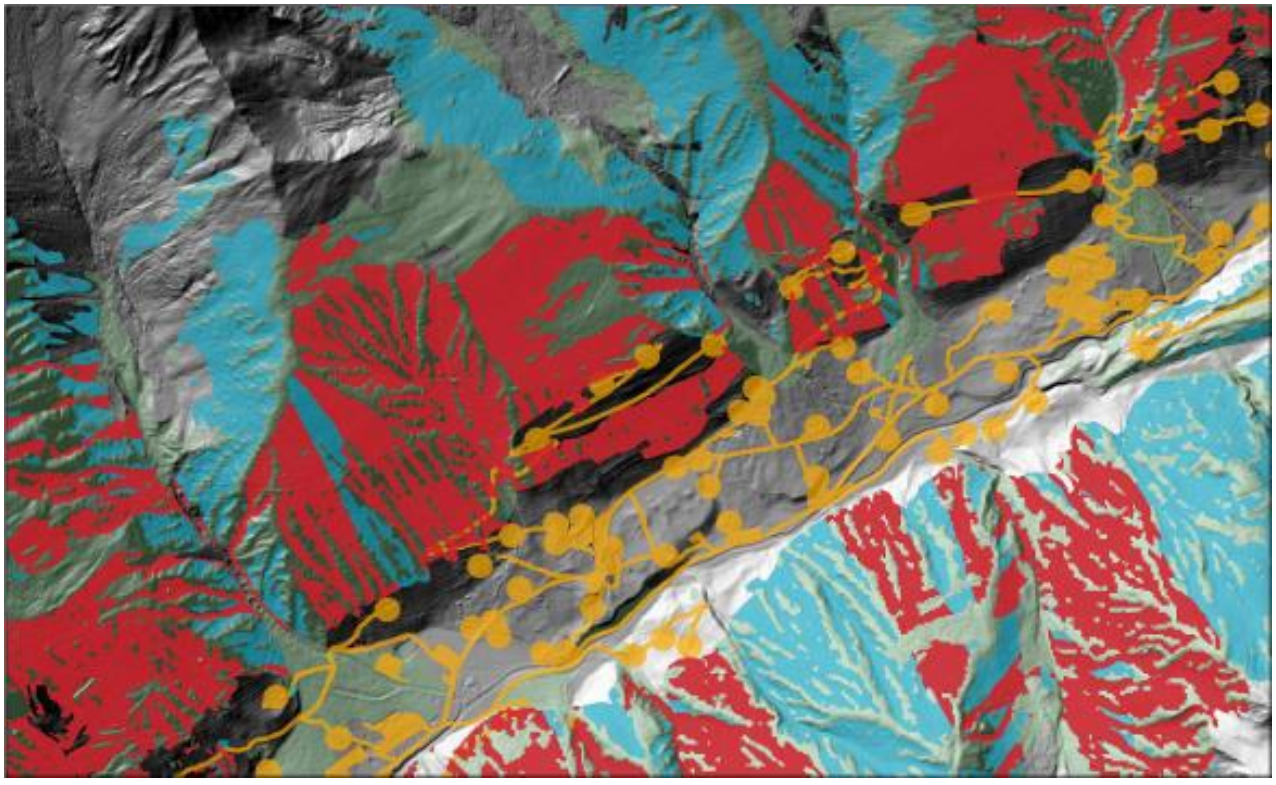


Fig. 12: Avalanche protective forests.
In orange - risk potential, in red - object protection, in blue - site protection forests.

In the whole province site protection forests have an extension of 1131 km² (33% of the forest area; 560 km² of these are object protection forests (16% of forest area).
Rock fall protection: rock fall risk was simulated with the BUWAL method (1988) within the INTERREG IIIA project I-CH *Informationssystem Hydrogeologische Risiken*, based on geological information and the digital terrain model. Trajectories and deposition areas had already been mapped and has been transformed into a vector perimeter in order to be intersected with forest area and damage potential area (Fig. 13).

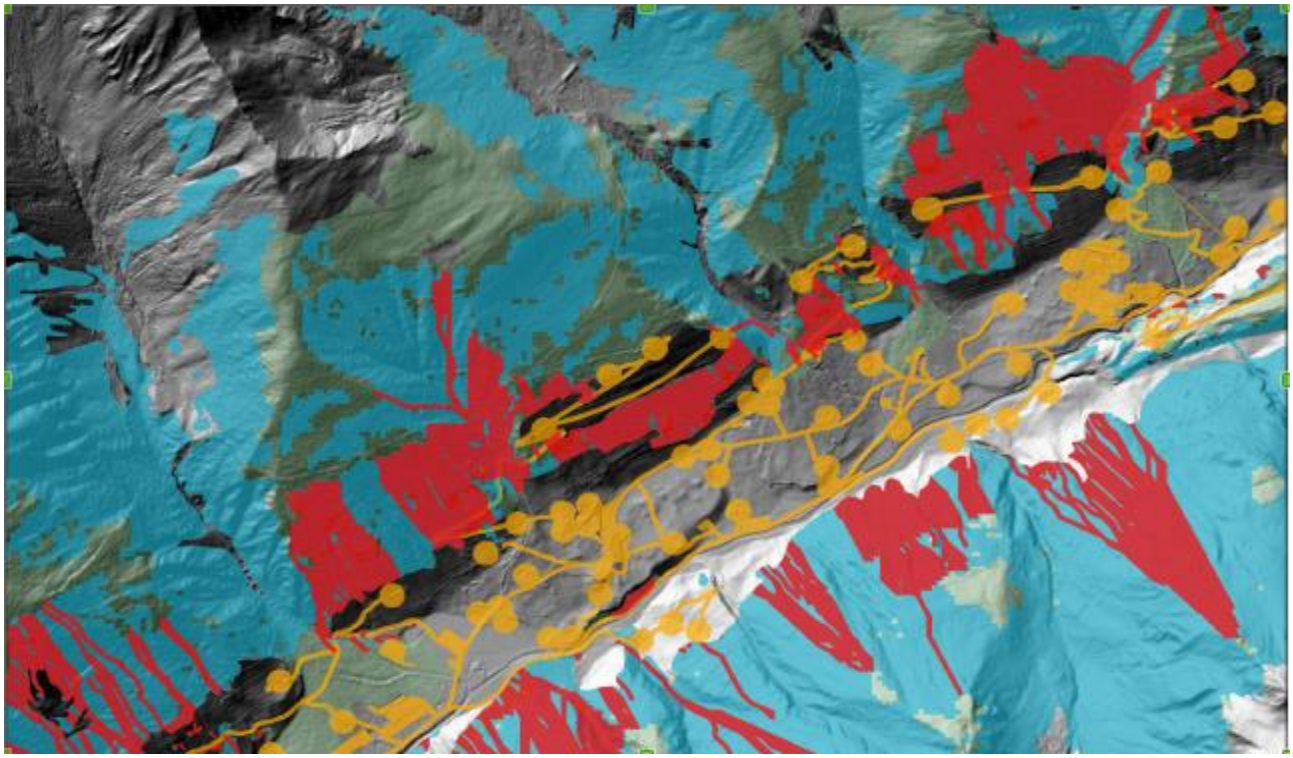


Fig. 13: Rockfall protection: colors as in Fig. 12.

In the province, rock fall site protection forests cover an area of 1772 km² (51% of the forest area); object protection forest in 451 km² (13% of the forest area).

Debris flow protection: in the above-mentioned INTERREG project a risk map for geomorphological and hydrogeological risks had been devised. For any basin the maximum solid transport load, maximum water discharge and debris flow potential (small/large) were estimated and the most critical areas were determined. Risk zones and the forest cover of the critical areas where used to define protective forests (Fig. 14).

In the province debris flow site protection forests cover an area of 227 km² (7% of the forest area); object protection forest in 133 km² (4% of the forest area).
Due to quality of available data and structured information (risk zone for rockfall and torrent processes) the cost of the mapping has been quite low (3,4 €/km²), providing forest and land institutions a useful instrument to guide forestry policy and maintain/improve the protective function.

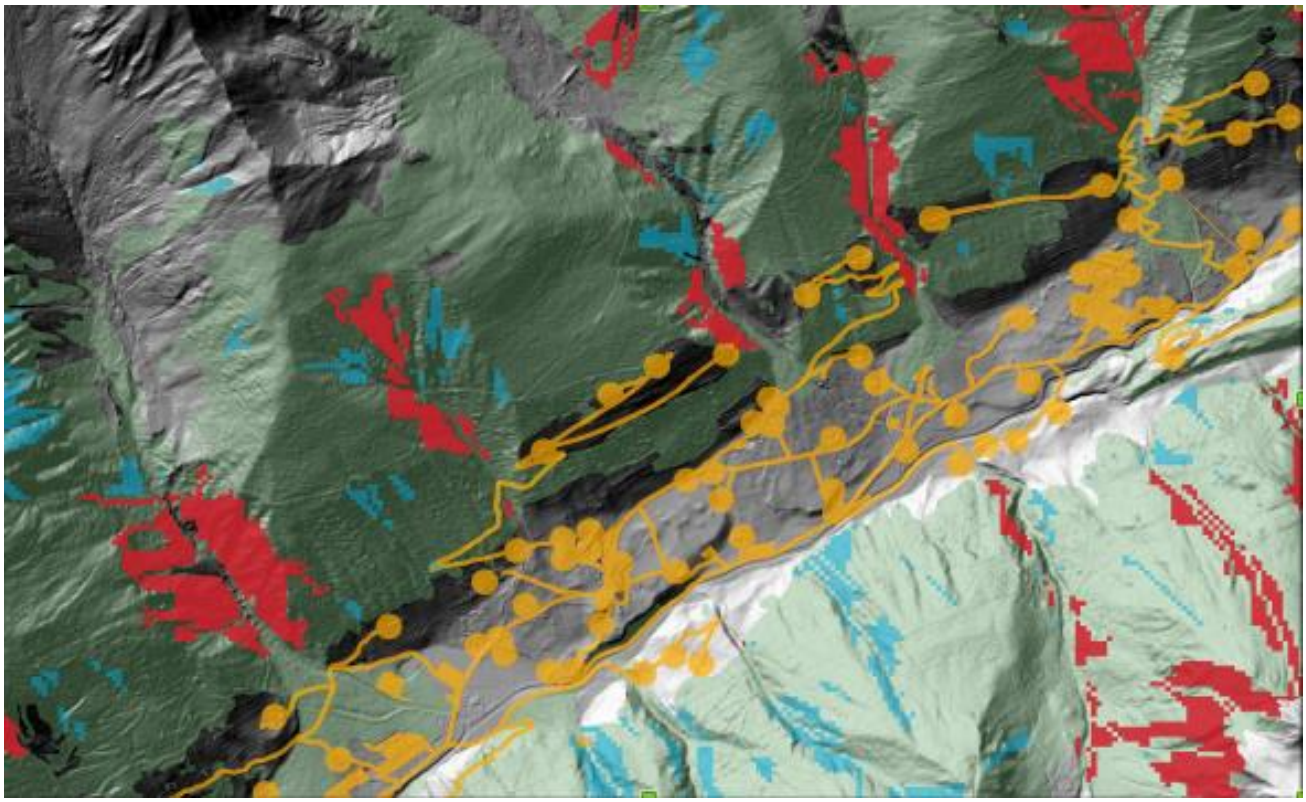


Fig. 14: Debris flow protection forest: colors as in Fig. 12 and 13.

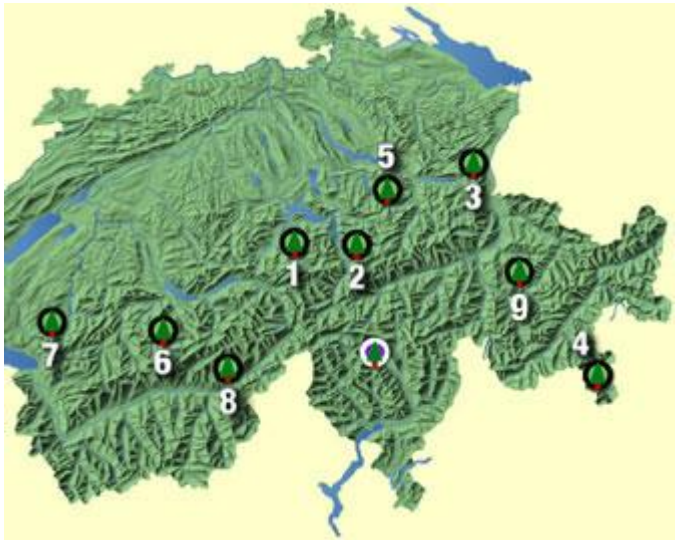
Italy, France, Switzerland: Creation of a network of operators on multifunctional forest management

Project	Creation of a network of operators on multifunctional forest management
Funding	Interreg IIIA Italy-France 2003-2006 "Sustainable management of mountain forests with protective function" Interreg Alcotra 2007-2013 "Protection forests: management techniques and innovation in the Italian Alps" Interreg IFP FR-CH 2007-2013 "Interreg Protection forests"
Countries Regions	Paese/regioni: Italy (Piemonte and Valle d'Aosta), France (Savoie, Haute-Savoie, Isère) and Switzerland (Valais, Vaud, Fribourg) Promoter / coordinator entity: OF Savoie agencies involved: France: Cemagref, Alpes-Maritimes, Centre régional de la propriété forestière Rhône-Alpes, Rhône, ENGREF (Ecole national du génie rural des eaux et des forets), Lycée agricole de Poisy, SIVOM du Haut-Chablais, Commune de Chamonix-Mont-Blanc, Syndicat mixte ARLYSERE, Communauté d'agglomération de Grenoble Italy: Forestry Services of Val d'Aoste / Regione autonoma Valle d'Aosta, Aosta; Forestry Services of Piemont Region; University of Turin / Switzerland: Forestry Services of Fribourg, Forestry Services of Vaud, Ecole des gardes forestiers de Lyss, Antenne romande du WSL (Recherche sur les forêts, la neige et le paysage), Gisalp (Groupe international des sylviculteurs alpins)
Objectives	The mountain forests provide a wide variety of goods and services for society. Much more than the production of wood, these forests play an important protective role. Management of these forests is therefore essential, although their economic balance is deteriorating. The public and private forest managers of the border regions of France (Savoie, Haute-Savoie, Isère), Switzerland (Valais, Vaud, Fribourg) and Italian (Val d'Aosta, Piedmont) have joined forces to: • Strengthening relations, exchanges and joint training in relevant management of mountain forests at high ecological value, protectors of people and goods, but also economic value • Create a network of contacts at the local level • Achieving a state of cross-border knowledge • Develop technical reference documents to better define the actions to be implemented in protective forests • Improve dissemination of information and technical reference documents • Evaluate the effectiveness of the measures implemented in mountain forests • • To raise awareness among owners, public administrators and stakeholders
Actions, measures	Creation of an international network of forest operators to exchange experiences and know-how (dissemination of Swiss technical and

	harmonization of national savoir-faire) and the definition of a standard form for the implementation of training sessions. Establishment of a stable network of cross-border contacts at the local level on the issue of forestry in mountain forests with protective function, as well as a group of Italian-Swiss-French employment. Implementation of pilot training sites Development of technical reference documents: • Forestry in protection forests: addresses the structural stability characteristics that must have the wooded formations to exercise the function of protection, in relation to the hazard types and the forest types, with an evaluation form of the protective role of forests; - Natural and stability in the western Alps: reviews disorders and major natural disturbances and gives useful indications for the prevention and mitigation; • Forestry and economic assessments in the Western Alps: numerous operational cases, real scale to be role models, are presented and the effectiveness of silvicultural measures and the cost-benefit economic discussed
Years	2003-2013
Costs	About 4.462.000 €.
Contacts, further information	www.risknet-alcotra.org The handbooks are downloadable from the websites: http://www.regione.piemonte.it/foreste/it/pubblicazioni/89-pubblicazioni/manualistica/744-selvicoltura-nelle-foreste-di-protezione.html http://www.regione.piemonte.it/foreste/it/pubblicazioni/89-pubblicazioni/manualistica/837-foreste-di-protezione-diretta.html http://www.interreg-alcotra.org/public/projects-docs/66/Guide%20des%20sylv%20de%20montagne%20-%20FR.pdf

Switzerland: Training trails for protection forests

Project	Training trails for protection forests
Funding	The project was financially supported by a group of private insurance, related to the Association of Insurance ASA Switzerland, an alliance concluded by 22 Swiss insurance companies to cover the damage caused by natural elements GIBP: Information group "Forests and natural hazards" SILVIVA: organization for environmental education
Country **Regions**	Switzerland Promoter/Coordinator Entity: Information group "Forests and natural hazards" (GIBP) Implementing agency: SILVIVA, organization for environmental education
Objective	Provide the public with basic information with respect to the meaning and value of protective forests through an interactive and emotional activity.

Actions	9 educational trails (Fig. 15) have been realized presenting in depth the theme "natural hazards and protection forest", through installations and interactive themed tables. For each path a special guide containing the description of the observation places is then set up, additional information as well as additional elements to deepen the experiences along the educational trail. The nature trails are addressed to the entire population: children, teens and adults of all ages. They are particularly suitable for teachers, those responsible for tourism, tourist operators, forest operators and representatives of alpine organizations, nature conservation associations and the establishment of training.  **Fig. 15: Educational trails for protective forests.**
Years	2002-2006
Contact, further information	www.foret-protection-population.ch http://www.svv.ch/it mailto:wald-landschaft@ow.ch http://www.silviva.ch/