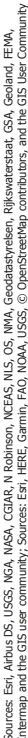






# C21

has responded to the changing social and administrative context by maintaining the key objective of managing the forest–pastoral resources, and expanding its competences to the management of safety and the environment, thus responding to current needs and opportunities.



453

# Statement

“Production and protection forests in a changing environment.”

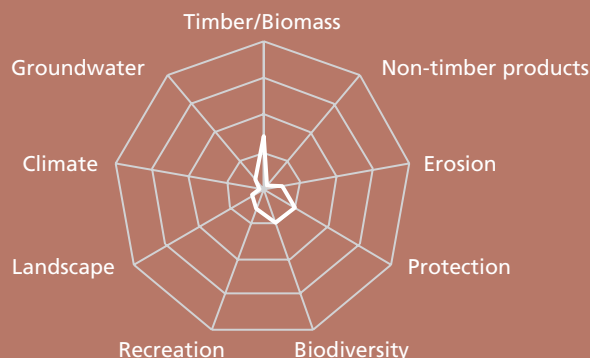


Table C21.1. General information on the forests of the Upper Susa Valley Forest Consortium.

Total forest area	18 600 ha
Total volume	Up to 500 m <sup>3</sup> /ha
Annual growth	Up to 2.2 m <sup>3</sup> /ha
Annual cutting rate	3000 m <sup>3</sup>
Main management types	Group and single tree selection cutting, group cutting
Deadwood	Up to 20 m <sup>3</sup> /ha
Elevation	600–2400 m a.s.l.
Climate	Mean annual temperature 7.4°C (range 2.9–10.1 °C), annual precipitation 960 mm (range 650–1350 mm)
Soil	Predominantly brown soils, generally slightly evolved
Ownership	70 % public, 30 % private
Protected areas	3985 ha
Natura 2000 areas	9232 ha
Protection forests	4500 ha

## Context

### Geography

The Susa Valley (Italian: Val di Susa) lies within the boundaries of the Metropolitan City of Turin, in the Piedmont region of northern Italy, located between the Graian Alps in the north and the Cottian Alps in the south (fig. C21.2). It is one of the longest valleys of the Italian Alps. The valley is of glacial origin with an east–west course, characterised by the presence of two important and historical natural Alpine passes, Montgenèvre (1854 m a.s.l.) and Moncenisio (2083 m a.s.l.), which over the centuries have made the valley a preferred connection between France and Italy (Marincioni and Appiotti 2009; Gras and Tonini 1991).

The anthropic presence in the valley has always been quite intense, as evidenced not only by the

archaeological findings, but also by the morphology of the territory, characterised by large areas enclosed by dry stone walls to allow cultivation, and the presence of ancient villages with typical local architecture (Giordano *et al.* 2016).

The Susa Valley is a transversal endo-alpine valley characterised by low precipitation. The weather systems that bring precipitation to the valley originate from the encounter of cold air masses of North-Atlantic origin with hot-humid air masses of North African origin. During winter, warm and dry foehn winds blow from the west. Winds coming from the east bring more humid air masses but, after the first stretch of the valley (up to Condove), they reach the upper valley with reduced humidity (Brun 1989).

These climatic features determine numerous environmental peculiarities, such as habitats of

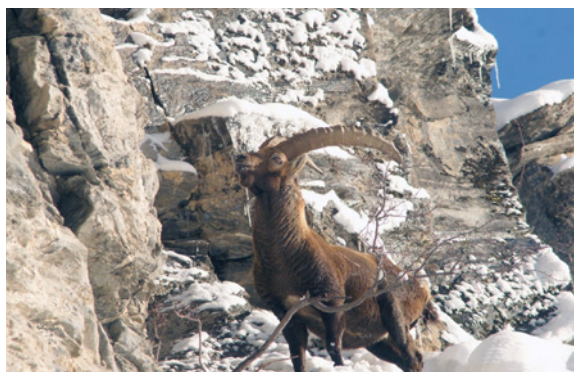


Fig. C21.2. Protected species of particular interest within the areas managed by the CFAVS: alpine ibex (left) and bearded vulture (right). Photos: Davide Pittavino).

high environmental value and several endemic animal and plant species present in the Susa Valley (fig. C22.2). The Susa Valley hosts three regional natural parks (Gran Bosco di Salbertrand Natural Park, Orsiera Rocciavère Natural Park, Val Troncea Natural Park) and one provincial park (Lake Borello – Oulx Pond), as well as 15 Special Areas of Conservation (SAC, Italian: Zone Speciali di Conservazione, ZSC) established within the EU Habitats Directive (Natura 2000).

The CFAVS manages the properties of the 14 municipalities in the westernmost part of the Susa Valley: Bardonecchia, Cesana Torinese, Chiomonte, Claviere, Exilles, Giaglione, Gravere, Meana di Susa, Moncenisio, Oulx, Salbertrand, Sauze d'Oulx, Sauze di Cesana, and Sestriere. The managed properties account for approximately 18 600 ha of PEFC (Programme for the Endorsement of Forest Certification) certified forests, in both mesalpic and endalpic zones, distributed from the bottom of the Dora Riparia Valley to the upper limit of trees and vegetation. The public (municipal) property covers about 70 % of the territory and interfaces with small patches of private property. The state/dematerial property is very limited (<1 %).

### Landscape context

The landscapes of the area covered by the CFAVS are diverse, as they cover a climatically and morphologically varied territory that develops on slopes with prevailing north–south exposures and more limited portions on the remaining quadrants and altitudes, which range from 600 m a.s.l. near Susa

to the tops of the mountains that touch 3500 m a.s.l., with pioneer subalpine forest stands reaching 2400 m a.s.l.

The bottom of the valley is urbanised and affected by linear infrastructures (highways, state roads, railways), with limited portions of land still used for agriculture. Forests occupy large areas along the slopes, while alpine pastures and rocks are found at higher elevations. Nowadays, glaciers occupy very limited parts of the territory.

The prevalent endalpic context of the upper Susa Valley favours the presence of European larch (*Larix decidua*) woods, which makes up 66 % of the forests, followed by Scots pine (*Pinus sylvestris*) forests (15 %), which dominate the south facing slopes (fig. C21.3). Other forest formations of significant interest are those dominated by silver fir (*Abies alba*), present in cool sites of the mountain plain (<10 %), and mixed maple–linden–ash (*Acer pseudoplatanus* and *A. opalus*–*Tilia platyphyllos* and *T. cordata*–*Fraxinus excelsior*) stands and chestnut (*Castanea sativa*) groves that characterise the low elevations. The remaining limited and fragmented forest areas are extremely varied, including chestnut, beech (*Fagus sylvatica*), alder (*Alnus viridis* and *A. incana*), Norway spruce (*Picea abies*), oak (*Quercus petraea* and *Q. pubescens*), riparian formations and reforestation. Some of these, however, represent sites of high interest and importance, and are in some cases protected by the Natura 2000 Network (fig. C21.3).

The forest stands are managed as high forests. Coppice stands, which have always been poorly

represented on municipal properties, are in the process of active or passive conversion into high forests.

### Ownership structure

The CFAVS is a company owned by the 14 member municipalities. It does not receive public financial contributions, but participates in calls for projects and works that guarantee the annual functioning of the CFAVS, and supports the technical sectors of the mountain communities (Italian: *Unioni Montane*) and municipalities.

The CFAVS is administered through: the Assembly of Mayors, which dictates the political and institutional guidelines; a Board of Directors, which updates and coordinates the decisions taken; and a Technical Director who coordinates the personnel and the specific work.

The CFAVS employs about 35 people and is divided into five functional areas that meet the different needs of the territorial management:

1. Forests: active forest management, forest planning, pasture management, trail network, Natura 2000 Network, fires, Rural Development Programmes (Italian: *Programma di Sviluppo Rurale*, PSR) and Interreg funding.

2. Mountain basins: planning and management of land management works, maintenance, disruptions, naturalistic engineering, and forest road network.

3. Forest construction sites: implementation of works and interventions for the ordinary and extraordinary maintenance of the territory.

4. Surveillance: originally a fundamental service of the CFAVS; currently the surveillance function in the strict sense is in decline, in favour of technical roles in the territory.

5. Administrative area: economic, financial, and personnel management.

The CFAVS manages about 66 300 ha of total municipalities areas, of which about 47 700 ha are municipal land other than forest (mainly pastures, rocks, and screes), and about 18 600 ha are municipal forest areas.

### Forest history and cultural heritage

The Susa Valley is an historical transit route of international importance for trade, war, and people (Marincioni and Appiotti 2009).

The war events until 1700 had a major impact on the extension and management of the forests, with strong pressure on the whole rural complex, while from 1800 the territory and the environment of the valley were mainly influenced by the industrial development (transportation system, metallurgical industries, textile industry, and mining). In this context, the CFAVS was founded in 1953 to manage a natural heritage in need of strong protection and that was still an important economic resource.

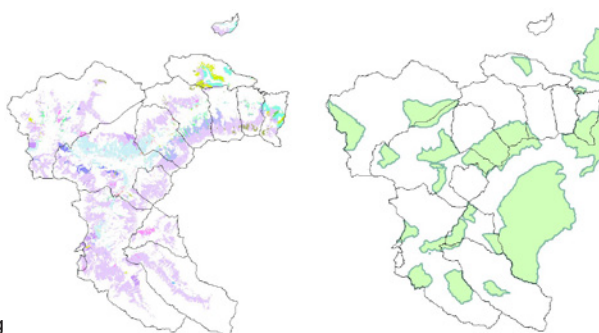
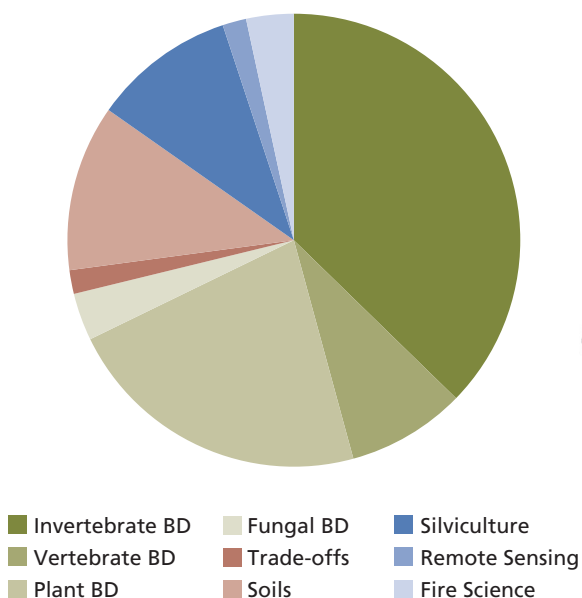


Fig. C21.3. Species composition of the forests managed by the CFAVS (left) and their location within the consortium (middle); sites of the Natura 2000 Network (in green) in the Upper Susa Valley (right).



Over time, the economic value of wood as a raw material has gradually decreased, while aspects related to the safety of the territory, guaranteed by important maintenance works on roads, watercourses, and the forest stands themselves, and the externalities guaranteed by the forest (i.e. landscape, tourism, wildlife management, environmental protection and biodiversity, carbon credits) have assumed an increasingly important role, refocusing forest resources in relation to human activities (fig. C21.4).

At the same time, the wood market has been greatly reduced in terms of volume and economic value. There has also been an increase in interventions with multiple purposes associated with the production of raw materials after disturbances (e.g. avalanches and wind), and the maintenance and improvement of the externalities offered by the forests (e.g. biodiversity, resistance and resilience, fire prevention, and water regulation).

Undoubtedly, climate change, whose effects on forests are not immediately evident and quantifiable, requires consideration and the development of new strategies to address climate threats to forest ecosystems. The increase in frequency and magnitude of natural disturbances recorded in recent decades calls for a substantial change of perspec-

tive compared to traditional forest management. New technologies, such as remote sensing (including satellite and Lidar data) are used to address these problems.

Extensive disturbances caused by Storm Vivian (February 1990) occurred in the Susa Valley; the forests have shown a remarkable ability to recover, even if the recovery has been slow because of the local climatic characteristics. The observations related to the recovery of forests after Storm Vivian have helped forest technicians to contextualise the most recent disturbances related to tree falling caused by avalanches (2008), heavy snowfalls (2012–2016), strong winds and, in the territory of the middle Susa Valley, large forest fires (2017).

### Demand for forest products

The active forest management responds on a local scale to the demand for larch timber to make shingles (a typical roofing material in the Susa Valley) and load-bearing structures for flagstone roofing, in addition to the supply of different carpentry assortments of larch. Parallel to the management of larch stands, silver fir and pine forests offer discrete quantities of wood, suitable for the production of packaging. The silvicultural interventions for the production of these assortments are techni-



Fig. C21.4. Nature-based tourism and outdoor recreation are important ecosystem services in the Upper Susa Valley (Photo: CFAVS).

cally managed by the CFAVS by means of forest plots assigned to mainly local forest owners by public auction, the revenues of which remain at the disposal of the municipality owning the forests.

The forests of the Upper Susa Valley also supply small quantities of high-quality timber such as assortments of Swiss stone pine (*Pinus cembra*), much appreciated in small carpentry, or sporadically very high-quality larch beams for specific processes, such as ship masts, and Norway spruce specially selected for the trial production of violins.

Assortments of larch of lower quality are often used for naturalistic engineering works (e.g. crib walls, barriers, and tripods) that use local materials and specific operating techniques for the realisation of highly functional works, which are well inserted in the territorial context under the ecological, landscape, and environmental aspects (fig. C21.5).

Residents in the Upper Susa Valley are also entitled to request small quantities of wood for domestic heating. The CFAVS, as manager of the municipal forests, identifies suitable trees considering that the operators, in this case, are not highly qualified to carry out the cuttings. Therefore, the timber allocated must be relatively easy to cut. These operations allow the thinning of stands that do not provide valuable assortments.

Finally, the management of forests in tourist areas (e.g. ski slopes) and in natural parks requires particular attention to the social and environmental context in which such stands are located: analyses conducted by the CFAVS have shown that the application of silvicultural criteria that respect the

specific needs of a given territory does not compromise the productivity or the quality of the assortments provided. These aspects must be linked to careful forest planning and continuous evaluation involving all stakeholders who interact with the work of the technicians and the forest managers.

### Main products and other ecosystem services

The main wood products of the CFAVS are:

- Timber wood from larch;
- Swiss stone pine for fine carpentry (fig. C21.6);
- Larch for specialised carpentry uses (e.g. beams, matchboards, and shingles);
- Larch for naturalistic engineering (e.g. crib walls, barriers, and tripods);
- Scots pine, Norway spruce and silver fir for packaging;
- Beech and other broadleaves for firewood;
- Assignments of wood for civic use (mainly beech, ash and larch, but also Scots pine, silver fir and other species are assigned as needed).

The multifunctional forests of the Upper Susa Valley offer other services and goods in addition to timber production:

- Protective function of forest stands that directly protect towns, infrastructures, and human activities from natural disturbances (e.g. avalanches and rockfalls);
- Ecological function, protection of biodiversity, and conservation of particular habitats and species (Natural Parks, Natura 2000 Network, fig. C21.7);
- Tourist-recreational function linked to the tourist vocation of the Upper Susa Valley, with the



Fig. C21.5. Larch crib wall (left) and tripods (right) (Photos: CFAVS).





Fig. C21.6. Wood pile of Swiss stone pine, Piccolo Bosco di Salbertrand, Gran Bosco di Salbertrand Natural Park (Photo: CFAVS).

presence of ski resorts, areas of public use adjacent to the villages owned by the municipalities, forests located along high traffic roads;

- Landscape function that characterises the mountain and alpine context of the Susa Valley.

#### Specialities and rarities

- 3 regional natural parks (Gran Bosco di Salbertrand, Orsiera Rocciavère, Val Troncea, belonging to the Cottian Alps Protected Areas Management Authority);
- 1 provincial park (Lake Borello – Oulx Pond);
- 15 sites of the Natura 2000 Network;
- 11 veteran trees (fig. C21.8).

Numerous protected species, of which of particular interest:

- Wolf (*Canis lupus*), living in the Susa Valley in three stable packs (listed in Annex II of the EU Habitats Directive, but also protected by the Bern Convention, CITES, and the EU regulation of trade of fauna and flora);
- Alpine ibex (*Capra ibex*), present in the Upper Susa Valley on rocky slopes with southern expo-

sure (listed in Annex V of the EU Habitats Directive, but also protected by the Bern Convention);

- Bearded vulture (*Gypaetus barbatus*), present in the Gran Bosco di Salbertrand Natural Park (listed in the EU Birds Directive, the Bern Convention, CITES, and the EU regulation of trade of fauna and flora).

The CFAVS does not do and is not responsible for wildlife management. The conservation of the protected species is, however, an integral part of the applied forest management system.

#### Applied management system

The main silvicultural systems applied are:

- Group cutting: in pure mono-layered larch forests (fig. C21.9), mature beechwoods.
- Group and single tree selection cutting: in larch woods, Scots pine forests (fig. C21.10), mixed and multi-layered stands with silver fir and Norway spruce, beech woods, pure silver fir stands, subalpine woods, maintaining large margins within the forest stand.
- Thinning: applied during the juvenile phases of forest stands.





Fig. C21.7. Fall colours in the Gran Bosco di Salbertrand Natural Park (Photo: CFAVS).



- Conversion to high forest: in beechwoods previously managed as coppice woods.
- Controlled evolution: typical of protection forests where there is no active management but a periodic monitoring followed by possible interventions aimed at maintaining and improving the protective role of the forest.

#### **Aims of the enterprise**

What are the preconditions? Being a Consortium of Municipalities, the CFAVS must meet the technical needs of the municipalities for territory management. Additionally, the CFAVS must coordinate its activities with other territorial administrations, such as park authorities, the region, the Metropolitan City of Turin, and other associations acting on the territory.

What are the tasks? The main tasks of the CFAVS are the management of the municipal forest-pastoral properties and the maintenance of the territory.

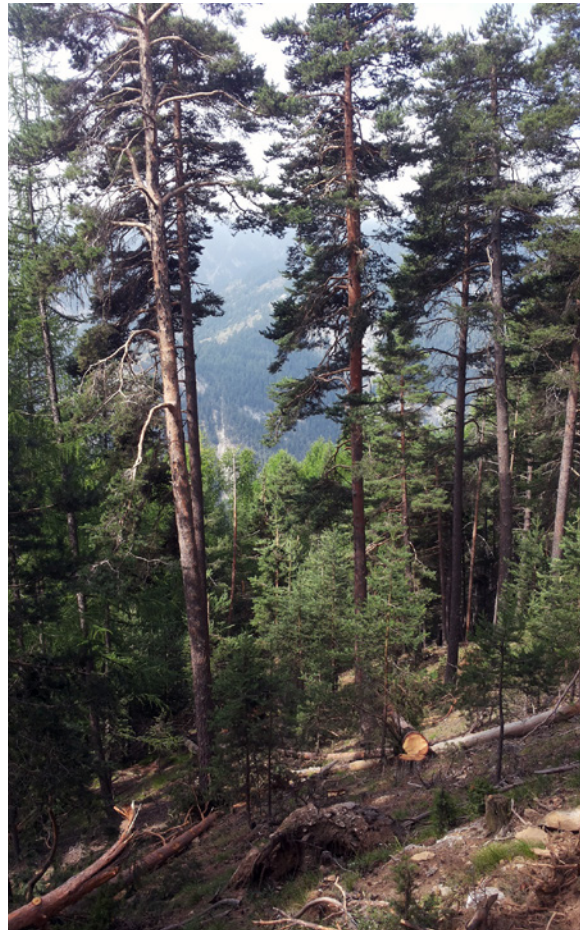
Fig. C21.8. Veteran beech (*Fagus sylvatica*) in Moncenisio, Upper Susa Valley (Photo: CFAVS).





Fig. C21.9. Group cutting and natural regeneration (right) in the Gran Pertiche larch forest (Photos: CFAVS).

Fig. C21.10. Group (left) and single tree (right) selection cutting in Scots pine forests (Photos: CFAVS).





What are objectives and trade-offs? The silvicultural management in itself is not sufficient to ensure the functioning of a structure such as the CFAVS, and is thus subordinate to the management of other more remunerative activities. The forest management, however, remains the objective of the CFAVS, and is also an efficient way to support local supply chains and to contribute to land management in different ways, providing multiple ecosystem services.

## Strengths and weaknesses

### Management

- The presence of extensive larch forests producing wood assortments is the strong point of the active forest management of the CFAVS;
- The higher revenue is provided not by silviculture but by the ordinary maintenance of the territory (Italian: Autorità d'Ambito Torinese, ATO Funds) and the participation in the Rural Development Programmes (PSR);
- Every activity must safeguard the protection goals of the protected areas in the territory (Parks and Natura 2000 Network);
- In the last 10 years the CFAVS has followed programmes to improve the local hiking network through the creation of hiking trails, the maintenance of trails, the preparation of signs and rest areas, in compliance with PSR calls;
- The forests affected by the natural disturbances in the Upper Susa Valley have shown good resilience, although in some cases climatic and local factors determined a slower forest recovery. In certain conditions (xeric or particularly cold slopes) the forest dynamics are particularly slow. The CFAVS integrates principles of close-to-nature silviculture into management plans, to favour, in the medium- and long-term, the presence of mixed and multi-layered forests that are more resilient to biotic and abiotic disturbances;
- The policy generally intervenes on issues that from a technical and management point of view are known, by providing and standardising rules and methodologies. The scientific information available on many topics, and the rapid evolution of tools and technologies to address problems, require that professionals update their knowledge and skills; this is difficult to guarantee and maintain, even by the administrators.

### Policy

The reference legislation for the CFAVS is primarily at the national and European level; specific regional regulations also apply. The region is the legal entity with which to interface to respond to all technical and management needs, sometimes also with proposals and special agreements in support of decision-making.

### Science

The CFAVS mainly plays a technical role. However, the staff often contributes to scientific and material support into research projects. The CFAVS collaborates with the University of Turin, the Institute for Wood Plants and the Environment (Italian: Istituto per le Piante da Legno e l'Ambiente, IPLA S.p.A.), the Piedmont region, and sometimes the Polytechnic of Turin and various French Institutions and Associations (e.g. Centre Regional de la Propriété Forestière–CRPF, Office National des Forêts–ONF, Restauration des Terrains de Montagne–RTM) on experiments and studies, also of innovative nature, to develop new technologies and empirical models.

### Communication

Communication is a time-consuming task that requires specific skills to be effective. The CFAVS is a structure supporting municipalities that also operates in the management of private properties, supporting citizens through the Forestry Desk (Italian: Sportello Forestale). Through this service, interested citizens can request, free-of-charge, advice and support for the management of their own forests, also for commercial purposes. In particular, the CFAVS promotes the associated management of forests, acting as a mediator between managers, owners (public and private), local users and citizens in order to coordinate time, area, objectives, and results of the active forest management.

### Existing and required tools to support the work of the enterprise

The CFAVS has been involved in active forest management for decades, constantly updating its forest management plans and databases. Today there is a need to optimise and standardise the data that are transmitted to different offices following different procedures that comply with current regulations. In this regard, the CFAVS collaborates with other institutions to optimise procedures that link the forest management plans of the CFAVS to the related

documents transmitted to the region (e.g. forest management authorisation documents, data related to cuttings and harvest plans). The update and implementation of internal procedures of the CFAVS serve as a blueprint for the management of such issues at the regional level.

The management of authorisation procedures for interventions on sites within the Natura 2000 Network requires the compilation of environmental assessments of the interventions and of the forest management plans themselves. These do not yet follow a clearly defined structure, and thus, still require to make evaluations and comparisons with the management bodies of the protected areas. In this context, it is still necessary to find strategies and documents able to meet the needs of the different stakeholders in respect of their institutional roles.

## Conclusion

The objectives of the CFAVS are achievable with the commitment and cooperation of other administrations. The main challenges derive from the continuous, constant and rapid changes in the areas of work (i.e. regulations, technologies, scientific aspects and climate change) which must be promptly tackled to maintain levels of performance appropriate to the needs.

The CFAVS needs to remain faithful to its territorial management objectives. However, the consortium has a strong need to renew itself and adapt once again to the changing social, economic, technological and natural scenarios, also through the support of new personnel with specific and targeted skills and assignments.

## References

- Brun, F., 1989: Ecologia e rimboschimenti del Pino cembro (*Pinus cembra* L.) in Alta Valle di Susa (English: Ecology and reforestation of Swiss stone pine (*Pinus cembra* L.) in the Upper Susa Valley). Master's thesis, Faculty of Agriculture, University of Turin, Italy.
- Giordano, E.; Giardino, M.; Perotti, L.; Ghiraldi, L.; Palomba, M., 2016: Following the tracks of Charlemagne in the Cottian Alps. The cultural and geological heritage of the Franks Trail (Susa Valley, Piemonte, NW Italy). *Geoheritage* 8, 4: 293–300.  
<https://doi.org/10.1007/s12371-015-0158-8>
- Gras, P.; Tonini, V., 1991: Le valli di Susa. Il bacino della Dora Riparia (English: The Susa Valleys). Il Capitello, Turin, Italy.
- Institute for Wood Plants and the Environment (IPLA S.p.A.), with the collaboration of the Upper Susa Valley Forest Consortium (CFAVS) and the University of Turin (DISAFA), 2016: Indicazioni tecnico-metodologiche per la redazione dei piani forestali aziendali – PFA (English: Technical and methodological guidelines for the drafting of local forest management plans).
- Marincioni, F.; Appiotti, F., 2009: The Lyon-Turin high-speed rail: the public debate and perception of environmental risk in Susa valley, Italy. *Environmental Management* 43, 5: 863–875.  
<https://doi.org/10.1007/s00267-009-9271-2>
- Regione Autonoma Valle d'Aosta, Regione Piemonte, 2006: Selvicoltura nelle foreste di protezione. Esperienze e indirizzi gestionali in Piemonte e in Valle d'Aosta (English: Silviculture in protection forests. Experiences and management guidelines in the Piedmont region and the Aosta Valley). Compagnia delle Foreste, Arezzo. 224 p.
- Regione Piemonte, Regione Autonoma Valle d'Aosta, 2012: Foreste di protezione diretta. Selvicoltura e valutazioni economiche nelle Alpi occidentali (English: Protection forests. Silviculture and economic evaluations in the western Italian Alps). Compagnia delle Foreste, Arezzo. 144 p.