CHAPTER 4
EFFECTIVE WATERSHED MANAGEMENT:
A EUROPEAN PERSPECTIVE

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Mountain forests mean 
more than forests in mountains

The views expressed in this paper come from three main sources: the policies of the European Union (EU), the process of the Ministerial Conference on the Protection of Forests in Europe (MCPFE), and the activities of the European Observatory of Mountain Forests (EOMF). Some facts, figures, factors and trends are reported with special, but not exclusive, reference to forests. After a short review of main issues raised and initiatives taken within the three sources, two examples are given, one of a project (France) and one of a programme (Italy). Finally, linking the demand of local communities to national, European and international forest strategies, some lessons learned and perspectives on effective watershed management are outlined from the field, policies, economy, planning, research and cooperation in Europe and beyond.

SOME FACTS AND FIGURES ABOUT WATERSHEDS ACROSS EUROPE

If almost all lands can be considered under the watershed concept and influences, mountain areas play a central role in the hydrology of large territories. EU statistics consider that 38.8 percent of the total EU-15 is mountain areas, with a population attaining 54 million people, of which two-thirds show a gross domestic product (GDP) lower than the EU-15 average (European Commission, 2001a).

Figures clearly indicate that mountain watersheds have a relevant geographic place, mountain people a strategic role and mountain economy a widespread disparity. Concerning the ecosystems in mountain watersheds, forests cover 36 percent of the whole areas, while mountain forests as a whole represent 27 percent (28.1 million ha) of the total EU-15 forest area. The mountain forest cover in Central and Eastern European countries (CEECs) is evaluated to some 23 million ha, excluding the Russian Federation, where forests are found over 75 million ha (EOMF, 2000).

Given the fact that forests are necessary, but not exclusive nor sufficient, for effective watershed management, these ecosystems dominate, or have been dominating, most mountain areas, and consequently affect the water balance of more than half of the European lands.

A statement from Netherlands scientists at the Freshwater Conference in Bonn, Germany, quoted by Messerli (2001), provides an astonishing figure: in the dry summer of 1976, 95 percent of the Rhine water flowing into the North Sea came from the Alps, from melting snow and ice at high altitude, and crossed forest in its downstream flow.
If this is simply a quantitative figure, other questions rise: e.g. what are the situations and trends of mountain watersheds in Europe? What are the main influencing factors, including forests, affecting them? What are the main risks or the opportunities?

This paper stresses the place and role of forest ecosystems in relation to these questions, considering that forests are never isolated castles in any environmental, social, economic and cultural living land. Nevertheless, forests contribute significantly to effective watershed balances, and much remains to be known on how and at what level.

CONDITIONS, SITUATIONS AND TRENDS

The EU has institutionally recognized mountain agriculture as having the condition of permanent natural handicaps in a way that mountains are so-called less-favoured areas “characterized by a considerable limitation of the possibilities for using the land and an appreciable increase in the cost of working due either to difficult climatic conditions shortening the growing season or to slopes too steep for the use of machinery or requiring the use of very expensive special equipment, or a combination of these two factors” (European Council, 1999).

On the environmental side, the European Commission has worked on the high natural value sites that are so frequent in altitude and imply restrictions in the use of land and resources. These factors, added to market, infrastructure and social limitations can be seen as the causes of a most serious trend in the abandonment of mountain areas by resident people.

BOX 1

MOUNTAIN FORESTS IN EUROPE

Concerning mountain forests, an impressive list of negative trends should – unfortunately – be mentioned when considering watershed management in Europe (EOMF, 2000). These are:

- growing instability of stands in the last decades;
- damages by pollutants, game, logging, fires, tourism and recreation activities;
- ageing of stands and overstocking of living and deadwood;
- lack of natural regeneration;
- biomass density;
- reduction of biodiversity;
- reduction in management practices;
- decrease in forest revenues;
- loss of local adapted knowledge and practices.

It is common to hear local inhabitants, owners or communities in mountain forest areas declaring these resources are paradoxically becoming a liability, a danger, a problem, while before they represented an asset, a security and the solution of many different problems. One must add that, along with the abandonment of mountain areas, urban society is claiming far more environmental services, losing conceptually the necessary link between natural and human resources.
We do not know exactly the range of ecological, technical and socio-economic consequences of the abandonment of resource-related practices in uplands and lowlands. P. Piussi (personal communication, 2002) considers this issue as a current scientific and social challenge.

The recent tragic flood events in Central Europe during summer 2002 seem to confirm this challenge: Beside the variability and intensity of climatic events, the increase of infrastructures and settlements, what is the influence of the abandonment of active and productive practices on watershed functioning?

The question can be turned the other way round: At what level can effective watershed management prevent or mitigate events such as those of last summer, or other serious events such as the storms Lothar (1999) and Vivian (1991) or the melting of permafrost and glaciers across the mountains of Europe?

PROGRESS ACHIEVED THROUGH PROCESSES, POLICIES AND INSTITUTIONS

Although many initiatives related to watersheds should be mentioned, this paper refers mainly to three sources:
- the policies of the EU;
- the process of the Ministerial Conference on the Protection of Forests in Europe (MCPFE);
- the activities of EOMF.

The paper presented by the Joint Research Centre of the European Commission will review further achievements in Europe (e.g. the Water Framework Directive).

Referring to some of the policies of the EU that may be affecting the new orientations in the management of watersheds, the last decade has been characterized by key political questions, such as the territorial cohesion expressed by “how to achieve a solidarity of peoples and equitably share the costs and the benefits in a diversity of territories?” (European Commission, 2001b).

The orientations of European structural policies are turning towards the working concept of territorial cohesion which refers to “policies aiming at strengthening relations between areas with marked differences in terms of their economic and social characteristics, rather than taking isolated measures specific to individual types of areas” (European Commission, 2001b).

In other words, the concept can be expressed as “keep people on the land”. It has a clear importance in watershed management as, at least in most of Europe, there cannot be any effective watershed management without balancing human resources, economic activities and natural resources. Another key policy carried by the EU that we refer to is rural development, also called the second pillar of the Common Agricultural Policy (CAP).

Although neither forests nor mountains appear in the treaties of the Union, the regulation on Rural Development (European Council, 1999) is a milestone for both. European countries recognized, since the Conference of Cork (1996), the diversity of situations, functions and interests of resources, such as forests and remote rural areas (i.e. mountains) in the context of rural development (see, for example, EOMF, 2000).
These resources in Europe share at least one main complex problem: their environmental and socio-economic fragility. Such a fragility and the diversity of situations imply a harmonization among actors at all levels with the aim of “maintaining and improving the ecological stability of forests where the protective and ecological role are of public interest and where the costs of maintenance and improvement measures exceed the income from forestry” (European Council, 1999).

Although actors can be a large number, we can identify here the two main groups of private (private or community owners, individually or associated) and public actors (public administration and management bodies).

One key instrument identified and implemented by the stakeholders is the land contract. Groups have to agree, on a local basis that fits into national criteria, on a long-term project to be implemented over an identified forest land. The principle of subsidiarity is fully included in the agreement, and all parties contribute “on the basis of the real costs of the measures to be carried out”. The parties are therefore committed jointly to participate and provide means (human and financial) for the implementation of actions.

Besides land tenure, private and community-based rights and responsibilities are given the highest importance as the central condition of sustainability, possibly supported by communication and capacity building.

The contract is a mechanism of agreement and commitment linking local and national actors, individuals and institutions in a common responsibility of effective governance. In particular:

- It is a way, by written or spoken agreement, of expressing the will to manage common concerns by common means, public money for public interests.
- It recognizes the need of maintaining and improving the “ecological stability” of forests, i.e. their capacity of providing values, goods and services.
- It sets forth the “public interest” of a specific set of resources subordinating the private rights and the market forces to the responsibilities and values of a larger portion of society.
- It implies a participation and a harmonization that help to manage and reduce conflicts of interest in the name of a recognized “public interest”.
- It asks for a negotiated and long-term commitment by the involved parties (the contract), which identifies together where, what, how and to what extent each one is responsible.
- It links the local mountain situation to the diversity of situations that all benefit from one another. The concept and practice of the contract includes understanding, responsibility, agreement and obligation by parties. They are all necessary steps, under many cultural and social perspectives, in sustainable management of resources. They are also a contribution to solidarity between people and territories (Zingari, 2001).

The Ministerial Process started in 1990 in Strasbourg. The Ministerial Conference on the Protection of Forests in Europe (MCPFE) is today of highest importance for the cooperation of more than 40 countries and some 30 organizations on key aspects of forests in Europe. From the very beginning, and two years before the Rio UNCED, mountain forests have been identified as a crucial issue by means of a specific resolution called S4 “Adapting the management of mountain forests to new environmental conditions”.

Effective Watershed Management: a European Perspective
This resolution, which is the only territorial one out of the 12 adopted so far, highlights the role of mountain forests in the regulation of hydrological cycles and in the fight against risks.

The S4 is a political commitment signed by 25 countries and the European Commission; in 1998, ministers gave its coordination, formerly provided by Portugal, to EOMF in shared responsibility with FAO and IUFRO.

Reviewing its achievements in terms of outputs, this resolution developed cooperation among countries through wide participation of actors in the exchange of experiences, methods and practices. It also contributed to raising awareness on the integration of the different roles of these forests in a larger territorial and rural development dimension.

The S4, on the basis of an action plan and close collaboration with FAO and IUFRO, has been acting as a political, technical and scientific instrument in the identification, formulation and implementation of actions.

The White Book 2000 on Mountain Forests, supported by the European Commission, assesses the situation and proposes five main actions:

- involvement of all actors in sustainable management;
- establishment of territorial contracts identifying objectives, measures, means and also responsibilities of different parties;
- development of wide economic approaches, including human and financial investments, payment for services of public interest, viability of small and medium-sized enterprises;
- promotion of quality of products and services;
- definition of integrated management plans.

These actions are relevant to watershed management considering the steps taken by European policies.

EOMF started its activities in 1996 on the initiative of the European Federation of Local Communities (FECOF) and the Government of French (Ministère de l’Agriculture, 1995). FECOF brings together municipalities, their associations and local communities, and represents 23 million ha of forests in Europe. In its European Charter of 1992, FECOF identified its strategy to include as a priority mountain forests because of their roles of public interest, protection of the environment and human activities, and agriculture of valleys. The activities of EOMF are threefold:

- to bring together governments and the EU (through the mandate of resolution S4), local forest communities (through FECOF) and all actors involved in mountain forest and forestry by thematic and systematic political, technical and scientific meetings and exchange of experiences;
- to follow-up local, national, European and international initiatives that may be of relevance for the actors;
- to propose tools, measures and guidelines that promote better management, capacity building and sustainability of natural and human resources.

Concerning watershed management, EOMF provides a platform for cooperation (e.g. with the FAO/EFC Working Party on the Management of Mountain Watersheds, with signatory parties of S4, with technical and scientific bodies) and exchange of experiences.
In concrete terms, EOMF produced the White Book assessing the situation in each European country and proposing a follow-up process on the five actions mentioned above (i.e. participation, partnership, integrated economic approach, promotion of quality of products and services, and integrated field planning). Today, all of these actions are implemented at different degrees through European legislation and policies, and – of course – by countries (e.g. the new French forest law).

The Scientific Committee of EOMF worked out and published in scientific journals the outputs of two events: an international symposium in 2000 on the concepts, methods and practices of multifunctionality; and a research course in 2002 on multifunctional management plans.

Since 1999, EOFM has worked in sessions and groups on the rural development aspects of mountain forests and forestry. In May 2002, a specific workshop was co-organized by EOMF in Scotland with the Forestry Commission and Euromontana (see Box 2).

**Box 2**

**EUROMONTANA, EUROPEAN OBSERVATORY OF MOUNTAIN FORESTS, FORESTRY COMMISSION, EUROPEAN WORKSHOP ON FORESTS, FORESTRY AND RURAL DEVELOPMENT, INVERNESS, UNITED KINGDOM, 18 MAY 2002**

There was a strong consensus on the following points, among others:

- Local communities are key actors and stakeholders in conservation and development.
- There is a need to engage and genuinely involve them in decision-making, including issues of control. This will inevitably happen at different stages, in different parts of Europe.
- We must avoid gaps between local action and wider strategic decisions by ensuring that decisions are communicated effectively to all stakeholders.
- Public money is for public benefits.
- In mountain forestry and rural development, some concepts and practices are central: resource diversification, human capital, rights, responsibilities, consultation, devolution, governance, community support and involvement, co-management, sustainability, solidarity and subsidiarity.
- There is a very important role for rural development plans, along with national or sub-national forest plans. These are key supportive tools for achieving integrated environmental, economic, social and cultural goals for rural areas. They require genuine commitment and a real means of implementation.

During the last International Consultation on Mountain Forests, held in Navarra, Spain and Région Aquitaine, France in June 2002, four main actions were recommended that are closely related to effective watershed management:

- **Widening perspectives.** Mountain forest resources and mountain forest-related communities are part of larger ecosystems and processes. Their influences go beyond mountain forest ecosystems and include: a) the mountain massifs; b) the conservation of their natural and cultural assets; c) rural development patterns; d) water and watershed management processes; and e) the improvement of economic, social and territorial cohesion (i.e. keep people on the land).
- **Reinforcing locally adaptive management.** A sustainable future for the complex, unique, fragile and interrelated ecological and socio-economic systems represented by mountain forest resources and mountain forest-related communities, including activities and practices, requires an approach to management forms adapted to local conditions and situations. Such an approach takes into account both traditional knowledge (i.e. knowledge and experiences developed by local populations) and interdisciplinary research, in mutual reinforcement.

- **Sharing responsibilities.** The permanent natural conditions in mountain regions and the interrelationships between upland and lowland areas require efforts in sharing responsibilities, involving local communities, promoting governance (see note below) and collaborative management, and strengthening solidarity at different levels. Bringing together a diverse set of actors in the definition and implementation of policies and good practices is a sustainable way to achieve these requirements.

- **Sharing benefits.** Mountain ecosystems, under appropriate management, provide a large set of benefits to lowland regions. Many socio-economic sectors are both benefiting from and influencing these resources. Alliances, coalitions, partnerships, agreements and contracts on forest conservation and management between local and non-local actors help in sharing benefits at all levels.

**An example of a project from France: the Management Plan of Natural Areas and Heritage of the Plateau de la Leysse, Savoy (France)**

The objective of this plan is “to manage the whole of the land sustainably, keeping it living and visited, allowing to develop its local economy and its own heritage” (Syndicat Intercommunal du Plateau de la Leysse, 2000).

Six municipalities within the Natural Regional Park de Bauges in Savoy, France experienced the abandonment of practices and resources (cultural, economic, natural and landscape) and decided to form a permanent partnership (a co-management syndicate) aiming at the objective of the plan. The area is totally mountainous.

With the support of the park, a debate involving the participation of all actors – specifically local communities and inhabitants – has been carried out on the identification of the different elements providing quality of life in the area (10 149 ha of total area, 4 653 ha of forests – of which 2 090 ha privately and 2 563 ha communally owned – 4 000 ha of agricultural land, 115 ha of dry prairies, and 600 ha abandoned, water sources, rivers, lakes, etc.).

Once the preparatory work had been done, a legal association was established to manage the preparatory phase. The operational plan identifies the specific sectors, areas, measures, means and funding in an integrated way. Beside the technical aspects, the plan includes a quantitative chapter on the involvement of local populations, and the sensitization of young people.

The rough estimated annual costs, excluding the initial investment of €100 per hectare, are: planning, €350; field management, €75; total €125. The relatively low costs identified, compared with the cost of managing more individual areas or sectors, comes from an approach of scale in planning and management.
It is interesting to conclude with two elements: the area is part of a watershed with a trend towards abandonment; and this watershed is close to the urban settlement of Chambéry (population 120 000) classified as being under flood risk.

An example of a programme from Italy: the Territorial Pacts

At the end of the 1990s, Italy two-thirds mountain areas experienced the legally binding instrument of the Territorial Pacts.

With no intention of evaluating results, the experience has some relevant characteristics related to watershed management.

The first element is harmonization among different local actors with no external conditions: participation is voluntary and all sectors are invited (administration, enterprises, banking, research, trade, etc.).

The approach is horizontal on a given territory (from small- to medium-scale – one watershed, to large scale – the whole Apennines along 1 600 km). The objective is the cohesion of different current and new initiatives involving resources, people and economic activities. The overall orientation of the Territorial Pact is then organized into specific activities, for example, the management of natural resources including water resources.

While the Territorial Pact offers a wide and coherent framework for actions with advantages in terms of economy of scale it has been stressed how the human and cultural dimensions influence its implementation. A review of these instruments in the context of rural policies has recently been made by the Organisation for Economic Co-operation and Development (OECD, 2002).

LESSONS LEARNED AND PERSPECTIVES

Currently, 80 percent of European land is rural, and 20 percent urban. Considering the rural area, forests cover in Europe reaches some 40 percent of the land. Eighty percent of the European population lives in urban areas. Rural areas, forest areas and urban population have therefore a big “responsibility” in the future of integrated and participatory watershed management linking upstream to downstream areas. Mountains, as remote rural areas, are also water towers for the rest of land. Forests in mountain areas are progressing faster than in other areas. Some of the challenges of watershed management in Europe are:

- an overall territorial approach linking mountain unities to lowlands (massifs);
- combined agro-silvopastoral land use;
- involvement of local populations and urban people;
- sound cooperation and communication between local and national authorities.

The EU is strongly supporting a mountain territorial approach in its reform and enlargement policies. The conference organized by the European Commission in October 2002 in Brussels on European Policies and Mountains will be crucial in presenting watershed management as a key aspect of mountain sustainability and mountain–lowland relationships.
In this context, and with reference to a number of positions expressed on the issue (see, for example, Pezzini, 2001; Van Depoele, 2002) the exchange of experiences and good practices should be considered as a basis for building a new generation of watershed management programmes. Our European regional workshop is a good example of exchange.

The following Table 1 summarizes, as an overview of achievements, gaps, lessons learned and perspectives, the various aspects of a process leading to more effective watershed management. It refers to positions expressed by local communities, particularly forest local communities members of EOMF, and national, European and international entities, such as the EU or MCPFE.

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<tr>
<th>Concepts, approaches and methods</th>
<th>Past generation</th>
<th>Next generation</th>
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<tbody>
<tr>
<td>Technical</td>
<td>Technical, ecological and socio-economic</td>
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<tr>
<td>Limited communication</td>
<td>Active communication, transparency</td>
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<td>Planned management</td>
<td>Collaborative management</td>
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<td>Management of resource</td>
<td>Management of resource and conflicts</td>
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<td>Hydro-geological</td>
<td>Hydro-geo-ecological</td>
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<td>Tree cover and/or plant cover</td>
<td>Forest and/or vegetation</td>
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<td>Forestry practices</td>
<td>Agro-silvipastoral systems</td>
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<td>Use of soil- and climate-adapted species</td>
<td>Use of habitat-adapted and indigenous species</td>
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<td>Growth and stability</td>
<td>Ecology and stability</td>
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<td>Protective role</td>
<td>Multiple roles</td>
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<th>Policies</th>
<th>Past generation</th>
<th>Next generation</th>
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<tr>
<td>Sectoral</td>
<td>Integrated (in) and intersectoral (out)</td>
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<td>Agricultural</td>
<td>Rural</td>
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<td>Forest</td>
<td>Rural</td>
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<td>Mountain</td>
<td>Upland–lowland</td>
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<td>Land, human-free</td>
<td>Territorial, human-influenced</td>
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<td>Centralized</td>
<td>Decentralized</td>
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<tr>
<td>Planning</td>
<td>Frame working</td>
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<td>Directive</td>
<td>Participatory</td>
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<td>Quantitative</td>
<td>Quantitative and qualitative</td>
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<td>Interventions</td>
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In the light of the views expressed, and from a forest perspective, the following key strategic elements are suggested for building the next generation of watershed programmes in Europe:

- active and accessible **communications on the place and role of watershed management** to involve the public and actors, with special attention to urban population (e.g. EPA, 2001);

- a **territorial and rural perspective**, urban–rural and upland–lowland links, with special attention to keeping people on the land, maintaining the viability of enterprises and balancing the quality of resources (water, soils, forests, air, ecosystems, agriculture) (European Commission, 2001a);

- the **participation, involvement and responsibility of all actors**, by means of territorial contracts or their equivalents securing the trade of products and the payment of public interest services (e.g. European Council, 1999);
• *links among existing policy and management instruments* (e.g. rural development, structural policies, water directives, national forest programmes) aiming at effectiveness (the right instrument at the right time) and coherence (integrate the instruments without multiply or opposing them; European Commission, 2001c);

• *a permanent effort of networking initiatives, exchanging experiences, increasing knowledge and providing capacity building* (e.g. FAO/EFC Working Party on the Management of Mountain Watersheds, MCPFE Resolution S4).

As a final suggestion and immediate step, a network of pilot sites, some of them already existing in Europe and providing different aspects of watershed management, could be established. Its objective would be to identify concrete cases where elements of different natures (conceptual, political, socio-economic, scientific, etc.) are presented, tested, discussed and further developed. Some of the existing institutions could contribute with their own capacity (e.g. EU, EC-JRC, FAO/EFC Working Party, EOMF, IUFRO, UNESCO-IHP, OIEAU, IGBP, etc.) and with the involvement of countries that will be the final beneficiaries of the initiative. EOMF is ready to act as a supportive network on mountain forest-related sites where improved orientations are under development at the local, national and transboundary levels.

**REFERENCES**


