

## Forest planning across Europe: the spatial scale, tools, and inter-sectoral integration in land-use planning

Sebastiano Cullotta<sup>a\*</sup>, Andrej Bončina<sup>b</sup>, Sonia M. Carvalho-Ribeiro<sup>c</sup>,  
Christophe Chauvin<sup>d</sup>, Christine Farcy<sup>e</sup>, Mikko Kurttila<sup>f</sup> and Federico G. Maetzke<sup>a</sup>

<sup>a</sup>Dipartimento Scienze Agrarie e Forestali, Viale delle Scienze, Edif.4 – Ingr.H, Università degli Studi di Palermo, Palermo, Italy; <sup>b</sup>Department of Forestry and Renewable Forest Resources, University of Ljubljana, Ljubljana, Slovenia; <sup>c</sup>Research Group on Mediterranean Ecosystems and Landscapes, ICAAM, University of Évora, Évora, Portugal; <sup>d</sup>Irstea, Unité de Recherche Écosystèmes Montagnards, Centre de Grenoble, St. Martin d'Hères, France; <sup>e</sup>Earth and Life Institute – Environmental Sciences (ELI-e), Forest Nature & Society Research Group, University of Louvain, Louvain, Belgium; <sup>f</sup>Finnish Forest Research Institute, Joensuu Unit, Joensuu, Finland

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New approaches to forest planning are needed to support the transition of European forests to sustainable management. The aim of this study is to review forest planning systems already in place throughout Europe by exploring a set of case-study countries reflecting the main silvicultural schools of Western Europe, including Belgium, Finland, France, Italy, Portugal, and Slovenia.

A literature review and case-study data were used to assess the scale factors (vertical logic) as well as the relationships between forest planning and other environmental/land-use planning sectors (horizontal logic). The influence of EU policy on the development of forest planning is also discussed. As assessed using the vertical logic, the multi-scale and multi-topic planning approaches adopted in the countries studied here are highly heterogeneous. The horizontal logic shows that despite the importance of an inter-sectoral and harmonic relational framework between forest planning and the planning efforts of other sectors such as landscape and urban planning, the various plans are barely consistent with each other across the European countries studied here. Although interest is growing in the multi-functionality of forests, their sustainable management calls for the development of better integrated planning approaches across Europe.

**Keywords:** forest management planning; forest program; multi-scale planning; multi-topic planning; inter-sectoral planning

### 1. Introduction

#### 1.1. The context

European countries, as participants in the pan-European program of the Ministerial Conference on the Protection of Forests in Europe (MCPFE), have adopted the concept of Sustainable Forest Management (SFM) as defined at several conferences such as Strasbourg (1990), Helsinki (1993), Lisbon (1998), Vienna (2003), Warsaw (2007), and Oslo (2011). In particular, the Helsinki (1993) resolutions state that “Forest management should be based on periodically updated plans or programs at local, regional or national

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\*Corresponding author. Email: [sebastiano.cullotta@unipa.it](mailto:sebastiano.cullotta@unipa.it)

levels, as well as for ownership units...". In particular, the development of the criteria and principles identified by the MCPFE (MCPFE 2003; Rametsteiner and Mayer 2004; Hogl *et al.* 2012) has incentivized national and sub-national bodies to develop common forest management and planning tools.

Forest planning at the national level has to define both the "basic principles" and the "elements" identified by National Forest Programs (NFPs). This was elucidated by the UN Intergovernmental Panel on Forests (IPF) and is enforced by the UN Intergovernmental Forum on Forests (IFF) and the United Nations Forum on Forests (UNFF). Furthermore, the Forestry Strategy of the European Union and the Agenda 2000 Program underline the importance of national and sub-national forest programs as a basis for the allocation of European Union Structural Funds.

At the international level, forest resources are viewed as an issue that transcends national boundaries and where the NFPs must attempt to achieve SFM (UNFF 2002). Thus, forests (as well as all of the other natural and semi-natural resources) acquire a greater and more "versatile" value, as expressed by their multiple functions. More recently, these concepts have also been expressed and reiterated by the "EU Forest Action Plan" (Commission of the European Communities 2006) with the aim of reviewing the existing regulations in the EU context to promote greater cooperation among the various political areas that influence forest activities. Among its political objectives, the Forest Action Plan emphasizes the need to develop plans at different scales through a participatory and shared approach to integrate the forest policies that exist at all levels (Marchetti and Mariano 2006).

At the base of forest management, nowadays sustainability of actions is generally a pursued target. SFM calls for very broad environmental social and economic goals (Parviainen 2010). Following the MPCFE, "The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems" (<http://www.foresteurope.org/es/node/24>).

Even if a shared and univocal definition of SFM is not so far achieved, because of the variety of underlying possible approaches (Schanz 2004; Hickey 2008) and in relation to the scale level (Hickey *et al.* 2005), yet a general needing for taking into account ecological, ethic, social, and economic issues is on the basis of the institutional framework of forestry rules at various levels. Particularly with regard to forest management, it refers to an equitable balance of those issues, saving them for future generations (Van Gossum *et al.* 2011): management is the way to make sustainability effective.

Forest planning can be defined in several ways. Some see forest planning as a technical-political activity that aims to rationalize the relationships between man and forests (Bovio *et al.* 2004); others refer to it as the discipline through which forest policy is expressed and management choices are made (Farcy 2004). Still others see planning as associated with integration across spatial boundaries and, therefore, as a "place making" instrument (Carvalho-Ribeiro, Lovett, and O'Riordan 2010). Today, forest planning is commonly discussed as the activity that organizes multi-objective forest management (Selman 2002; Brukas and Sallnäs 2012).

According to Pülzl and Rametsteiner (2002), there are three categories of approaches to forest planning observed at the international level: (1) "anarchical governance" (in which involved actors follow a "horizontal logic"); (2) "hierarchical governance", which follows a "vertical logic" of interaction between actors; and (3) "heterarchical

governance” (which is inspired by cooperative and deliberative ideas and uses both the vertical and the horizontal logic (see, e.g. Hujala and Kurttila 2010).

There are many approaches to land use and management planning that typically involve different classifications according to the level of analysis (i.e. the vertical logic). However, most land planning in Europe, as in many other countries, is carried out at a “micro-scale” dealing with highly localized issues at the farmer/estate level (Mitchell, Espie, and Hankin 2004). For example, given the high level of interest in forests’ productive capacity, and considering the wake effect as efficient,<sup>1</sup> European forest planning focused on local-estate management plans up to 1980 (Subotsch-Lamande and Chauvin 2002). The purpose of local-estate traditional forest planning was, and often still is, to organize production and yield across time and space (Farcy 2004; Farcy and Devillez 2005) based on principles of constancy and the long-term stability of silvicultural programs (von Gadow *et al.* 2007). For instance, in Italy, forest planning tools were traditionally exclusively limited to Local Forest Economic Plans (LFPs) or Forest Production Management Plans (FAPs) (Bachmann, Bettelini, and Cantiani 1999; Cullotta and Maetzke 2009). At the highest levels, forest planning consisted of national laws. Similar statements can be applied to many other European countries (von Gadow 1995; Chauvin 2002). Even if new analysis tools are now available (e.g. multi-criteria decision analysis, non-linear programming, decision support systems, etc.), in practice they are not widely adopted, nor required by the management rules (e.g. see FORSYS COST Action).

Increasing interest in the multi-functionality of forests and the application of SFM requires an integrated approach to planning (e.g. Boncina and Cavlovic 2009). In multi-functional forestry, forests provide economic goods (timber, fuel, food, etc.), fulfill a wide range of environmental and ecological functions, and provide several services (see, e.g. Millennium Ecosystem Assessment 2005; Cabbage, Harou, and Sills 2007; Slee 2007; Primmer 2010), resulting at the landscape level (Mander, Wiggering, and Helming 2007; Vejre *et al.* 2007). At the landscape scale, the concept of multi-functionality is most important for forest functions that work in synergy with the other uses of the land. In the context of the rural development, the most important frameworks for addressing multi-functionality (Dwyer 2007; Hagedorn 2007) are either through a single type of land use, such as forestry or agriculture, or by integrating several complex land-use types (both mixed cropping and intercropping, agroforestry systems, and agro-forestry interfaces).

Despite this recent trend, traditional tools used to plan environmental resources are still often embedded in sectoral approaches. Consequently, while plans exist for agriculture, forestry, and coastal areas, the links between these concerns and the whole landscape are vague. There are also other specific plans such as landscape economic plans, landscape social plans, and landscape heritage plans (Selman 2002).

Inside the same level of planning, integrated planning, and governing is required to find links and synergies among sectors to ensure the sustainable use of environmental resources such as water, air, agriculture, and forestry (Cullotta and Maetzke 2010; Pahl-Wostl 2009). In other words, an inter-sectoral and integrated relational framework among planning tools for forests and other sectors of environmental/land-use planning (landscape programs and plans, agriculture/rural development tools, urban planning, protected areas/nature conservation tools, etc.) should be constructed. A “landscape planning approach” should answer these needs (Zorn and Ishii 1998; Başkent and Yolasiğmaz 1999; Dolman *et al.* 2001; Subotsch-Lamande and Chauvin 2002; Paletto, Ferretti, and De Meo 2012; Laforteza, Sanesi, and Chen 2013), considering the landscape as an “umbrella” under which connections among planning tools from

different sectors are desirable and the integration of ecological and cultural values is possible. Moreover, the inter-sectoral coordination among different planning tools seems to be strongly influenced by the scale level, although it remains largely symbolic (Howlett and Rayner 2006), especially at the higher and intermediate levels (i.e. national and sub-national levels).

The current state of forest resources in Europe is particularly complex and calls for a more holistic and shared approach to forest planning. According to “The State of Europe’s Forests 2011”, which presented a pan-European view of this sector, European countries differ greatly in terms of the following (FOREST EUROPE, UNECE and FAO 2011): incidence of forests (ranging from 1% in Malta and less than 10% in the Netherlands and Great Britain to 86% in Finland and 68% in Sweden), altitude distribution, integrity and naturalness, biodiversity level, ownership, forest cover dynamics, forest function and multi-functionality, conservation level, silvicultural practice and management, and development programs and plans.

### **1.2. Aims and study approach**

The objective of this study is to review the different forest planning processes and their organization currently in practice in Europe by exploring a set of case-study countries (Belgium, Finland, France, Italy, Portugal, and Slovenia) according to the scale factor and their relations with other environmental/land-use planning sectors. Thus, forest planning tools are related to their geographic reference scale. Moreover, following a horizontal logic, this study highlights the importance of an inter-sectoral and harmonic relational framework among programs and planning for forests and other sectors (landscape, urban planning, hydro-geological land protection, etc.). The selected case-study countries are the result of a call for participation between a wide set of researchers contacted for this study.

To achieve the goals stated above, a wide survey of the literature was carried out, covering both scientific and normative documents regarding land use and forest programs and plans. In particular, this review considered the international perspective, paying special attention to EU-related documents, while also ensuring a detailed analysis of each selected case-study country. The bibliographical analysis regarded both international literature edited in English and mother tongue literature, in each of the countries, by local coauthors.

The analysis took into account the various levels of planning and examined the tools adopted, their connections with other sector tools, and some general considerations on mutual connections, where existing, based on legal requirements or on usual procedures in each country with regard to the items addressed. Each case-study country bibliography has been collected by local contributors. Normative acts in force and their history, planning tools, as well as related studies on international and local print (both in English and local mother tongue) were analyzed by coauthors for summarizing an exhaustive picture of each case-study country.

While the case-studies are not exhaustively representative of the variety of countries in the EU, these countries represent some of the cultural tradition and related forestry history, traditional management and planning approaches, and the economic importance of forests in each case-study country. Thus, the variety of countries studied here also reflects the ethos of the main historical forest and silvicultural schools of thought in the core of Western Europe (i.e. the French and German schools) (e.g. Badré 1983; Lowood 1990).

Based on this literature search, we will review some of the foremost important historical acts and current trends in forest policy and forest planning in Western Europe, with particular reference to the case-study countries, as a background to cross-scale forest planning and cross-sectoral analysis. The collected documents for each case-study country are critically analyzed to highlight (1) the hierarchical organization of the forest planning tools (vertical logic) and their relationships with the scale level (i.e. national, regional, sub-regional, local) and (2) the relationships and degrees of integration with other tools of environmental /land-use planning.

## **2. Main processes defining current forest planning in a set of EU countries**

### **2.1. Some historical milestones**

The historical evolution of the approach toward the use of forest resources can be explained by reviewing recent measures adopted by legislators in different countries to summarize a framework for each country studied here, providing some key details of the related processes.

In France, the first historical planning document aiming at a “forest sustained in a good state” dates from 1346, after a first peak in population in the high middle-ages. After some disorder, a first national forest plan (reformation) was settled in 1669 and was followed by Louis XIV and his minister Colbert to provide timber to the marines. Forest degradation continued despite this plan, and it was only in 1827 that a forest code was written, after the forest school of Nancy was founded in 1824. As did Colbert, this school promoted public forests and correlatively long-term management plans (Badré 1983). In a centralized and protective scope, the management plans of the public forests, written by forest officers, had to be approved by the minister. After the regionalization initiated in 1982, the validation of communal forest management plans was delegated to state authorities at the regional level. The regional guidelines are still to be approved at the national level, whose authority was confirmed by the forest law of 2001.

Italy has an ancient tradition in forestry, beginning with forestry regulation in the Roman empire, continuing with the first technical rules and inventories in the Venetian Republic (sixteenth century), the forest laws in the papal state (seventeenth century) and the post unitary law in 1877. This last law aimed to further protect forests and enhance reforestation. Then, a fundamental law on forest issues and forest planning was issued in 1923 (RDL no. 3267): for half a century, this law remained substantially unchanged and effective. This law focused on a set of hydro-geological restrictions. The decentralization process took place in the 1970s, transferring the primary responsibility for forest issues from the national to the regional-administrative level, creating a heterogeneous framework among the Italian regions. More recently, the Forest Act of 2001 (no. 227) assigned the Ministry of the Environment and the Ministry of Agriculture and Forestry the task of issuing forestry guidelines that the regions use to draft and revise their specific regional forest programs according to a multi-functional view of forest resources.

In Portugal, the Forestry Institute was created in 1886, while the “Forestry Regime legislation” (1901) is one of the most important in the history of Portuguese forestry. Inspired by French legislation with the same name, this law is defined as “implementation of legislation mechanisms to assure the creation, exploration and conservation of forests according to the national economy and to defend the public good as in safeguarding against erosion, preserving the water system and ensuring other environmental outcomes”. In addition to the Forestry Regime from the 1900s, throughout

the 1940s to the 1980s, the “Plano de Povoamento Florestal (PPF)”<sup>2</sup> aimed at afforesting the communal lands (baldios), as well as shrubland areas in the slopes and mountains, and the “Fundo de Fomento Florestal (FFF)”<sup>3</sup> aimed at promoting afforestation of private land. Other political measures included the “Projecto Florestal Portugues (PFP)”<sup>4</sup> and the “Programa de Accao Florestal (PAF)”<sup>5</sup>. All of these policy instruments implemented from the 1940s to the 1980s promoted afforestation mostly based on coniferous trees, particularly maritime pine trees (*Pinus pinaster*) (Moreira, Rego, and Ferreira 2001; AFN 2008).

In Belgium, the “Forest code” of 1854 focused on forest protection, on restoration of degraded forests, and on increasing wood production to respond to the needs of the nation. The code also organized a system of public forest management. With the new Code adopted in 2008 by the Walloon Region (WR), mandatory forest planning in public forests has been reinforced, with an explicit focus on the multi-functional role of forests.

The approach to forestry in Finland and Slovenia has mainly been influenced by ideas from the German school (see Lowood 1990).

In Finland, forest ownership is largely dominated by private non-industrial owners. The earliest holding level forest plans for certain large private forest holdings had already been created in 1878 by forest management advisors recruited by the state. The planned forest area increased yearly until the 1990s, and this planning was strongly oriented toward timber production. In 1997, a new forest law (Forest law 1093/1996) was adopted and required biodiversity to be taken into account. The goals of forest management and planning were changed and broadened in line with the demands from private and public owners to also consider other forest functions and services, such as bioenergy, biodiversity, and recreation (e.g. Ollonqvist 2001; Primmer 2010). In practice, this has meant that new aspects, such as biodiversity conservation, have been integrated into previously existing forest management plans that were oriented toward timber production (Primmer 2010).

In Slovenia, following an ancient forest tradition and a wood-based economy influenced by the German school, the first forest management plan was implemented in 1771. In 1852, the Austrian Forest Law was enacted, and a year later, the former servitudes were paid off and the farmers became the owners of the forest. At the end of the nineteenth and in the beginning of the twentieth century, Leopold Hufnagl introduced an ecosystem-based method of forest management, while Schollmayer introduced adaptive forest management; both have strongly influenced the future of forest planning in Slovenia. However, in the nineteenth and in the first half of the twentieth century, Slovenian forests were in poor condition. From 1945 until today, elements of sustainable, multipurpose, and close-to-nature concepts of forest management have been gradually affirmed (Boncina and Cavlovic 2009; Boncina 2011).

In conclusion, even from such a necessarily short historical overview, some similarities and many patterns of differences stand out among the examined countries. With reference to the similarities, we noted that the national law and the local-estate management were historically the two mandatory levels of forest planning, while other intermediate levels of planning generally are of latest adoption. Conversely, in some countries (e.g. Portugal, Finland), the municipal plan level, referring to the whole municipal district, is mandatory, and formally effective. The relationship and the mutual prevalence between planning tools of various items (e.g. forestry, agriculture, energy, protected areas) at the same level is quite different in the studied countries.

## 2.2. Europe's current forest dynamic and the centrality of the planning process

Currently, natural forest growth is greater than the rate of exploitation in many EU countries, and wood stocks are progressively increasing. The State of Europe's Forests 2011 reports that in 1990, forest covered 194,300,000 ha in Europe (excluding the Russian Federation), while in 2010 the total amount of forested area was estimated as 210,850,000 ha. This increase occurred to a different degree in different countries, but was observed in almost every EU country: for instance, the forested area in France increased from 7,500,000 ha in the middle of the nineteenth century up to 16,000,000 ha in 2010 (IFN 2010; ONF 2010); in the WR of Belgium, forests now cover 553,000 ha or 33% of the WR's territory, compared with 240,000 ha in 1854; in Slovenia, the forest coverage reached 58.8% in 2008, following the overgrowth of abandoned agricultural areas, and the harvest rate amounts to only 60% of the available total, mainly because of the prevalence of small-scale private forest property; between 1990 and 2010, Portugal gained 3.9% of its forest cover, or approximately 129,000 ha, and in total, forests cover approximately 38% of the national territory.

European forests are significantly affected by humans (Kuusela 1994; Bengtsson *et al.* 2000; Barbati, Corona, and Marchetti 2006; FOREST EUROPE, UNECE and FAO 2011). The cutting of forests followed by the broad reforestation effort over the last 100 years has resulted in a situation where virgin forests are almost non-existent in Europe and old growth forests are limited to restricted areas (Parviainen 2005; Veen *et al.* 2010). The majority of European forests consist of semi-natural wood or plantations, and as such are shaped by human activity and management. Only about 4% of the forest area in Europe has been classified as undisturbed by man in the TBFRA 2000 Main Report (United Nation 2000; Puumalainen 2001).

In fact, at the national level, many countries have adopted specific policy legal instruments designed to sustain land afforestation and forest management. In Italy, the 1923 Forest Act established the temporary expropriation of private mountain land for the public good. In those areas, the forest authority manages reforestation plans by plantations to enhance both hydro-geological protection and timber production. In France, the afforestation of the "landes de Gascogne" (1 Mha) was initiated by the law of 1857, while the reforestation of eroded mountains (200,000 ha) was organized by the laws of 1860 and 1982 on the "Restauration des terrains de montagne", which defined specific "perimeters" to be restored with a multi-functional scope on private or public degraded lands. After World War II, a special tax on forest products financed the afforestation and reforestation of approximately 2 Mha between 1946 and 2000 through the "Fonds Forestier National" (National Forest Fund).

Similar processes can be observed in many other European countries (see, e.g. Harrison and Hill 1998; Marey-Perez and Rodriguez Vicente 2008).

Planning activities and management have also greatly influenced the composition and structure of European forests, as during the nineteenth century, the demand for wood fuel led to widespread coppices. The industrial demand for timber then drove management plans toward a maximization of the production function of forests, strengthening the role of even-aged managed stands, and often disregarding the importance of the ecological role of forests.

The social desire for SFM led the public to become critical toward the previous management system that favored the productive approach adopted by foresters. As the population became increasingly concentrated in towns, expectations of forests changed, and more importance was assigned to the non-timber products and services provided by

the forest (Janse and Ottitsch 2005; Gatto, Pettenella, and Secco 2009). As a result, foresters were often forced to reconsider their role, share their plans, and rebuild their credibility and their relationships with the general public (Thomas 2002). At the same time, the abandonment of rural and mountain areas and the ageing of the rural population resulted in a slow change of land use and consequently of landscapes, with agricultural practices yielding to a progressive expansion of forest and pre-forest vegetation (e.g. McDonald *et al.* 2000; Mazzoleni *et al.* 2004; Moreira and Russo 2007). According to Navarro and Pereira (2012) and Stoate *et al.* (2009), the progressive abandonment of the mountainous and marginal areas interested the whole territory of Europe, although with territorial differences (for more details, see Figure 4 in Navarro and Pereira 2012). This occurrence has been more pronounced at the regional level, as, for instance, in the central and southern countries.

At the continental scale, the forest/non-forest interface and its borders have recently become highly ecologically dynamic due to the expansion of the forest cover over abandoned areas, particularly over the marginal farmland closer to the forested areas. These abandoned areas often host agro-forestry systems and are particularly widespread in Europe and in the Mediterranean areas. These systems are complex due to the presence of both cultivated and natural plant species (especially trees), the articulation of the landscape pattern, and the spread of micro-sites (both natural and man-made, including trees outside the forest, hedgerows, traditional artifacts, and terracing) (e.g. Meeus 1995; Pinto-Correia and Vos 2004; Barbera and Cullotta 2012).

The above discussed general trend of forest cover increase in Europe, as far as the changed request of services and sustainability of forest management, required a new set of planning and management tools to cope with the request of multi-functionality of forest and environmental resources.

### 3. Hierarchical organization of the forest planning in case-studies: the vertical logic

An in-depth examination of forest resource management and planning issues requires a careful consideration of the level of analysis to apply. Considering the trans-boundary and trans-spatial value of forests, sustainable management of forest and environmental resources cannot be achieved solely through the use of micro-scale analysis, as has been historically applied in the forest sector in many countries. This approach must consider also the upper scale level within which any activity should be constrained (Burnett and Blaschke 2003; Mitchell, Espie, and Hankin 2004). Natural resource management, including forestry, should be a hierarchical process ranging from large regions with broad goals to small areas with specific operational features (Weintraub and Cholaky 1991; Church *et al.* 2000; Tittler, Messier, and Burton 2001). Land management policies should initially be developed for the higher levels of the hierarchy and then be scaled down to the local levels, taking feedback into account. The assumption is that an activity that is sustainable with respect to a higher level automatically regulates the range of activities that can be carried out at a lower level. However, such functional relationships are not always observed in this vertical logic.

The different forest planning tools applied in the studied European countries will now be analyzed. Table 1 provides a hierarchical summary of the different levels to which the concept of forest planning can be linked (Monin 2003; Cullotta and Maetzke 2009). This summary extends from the most general level – the national – to the local stand management via the regional and sub-regional (territorial<sup>6</sup>) levels, to structure and anchor

Table 1. Forest planning levels and related tools by countries. Other related forest planning tools are reported by brackets.

Geographic level	Country's tools (programs/plans)					
	Belgium (for WR only)	Finland	France	Italy	Portugal	Slovenia
National	NO SPECIFIC TOOLS	National Forest Program (NFP)	National Forest Program (NFP)	National Forest Program (NFP)	Plan for the Sustainable Development of the Portuguese Forest (PSDPF) (1999)	National Forest Program (NFP)
Regional/provincial*	Environment Plan for Sustainable Development (with chapter on forests)	Regional Forest Program (RFP)	Regional Forest Orientations, and Pluri-annual Program of Forest Development	Regional Forest Program (RFP) (Administrative Provincial Prescriptions (PMPF)) (Regional plan for defense of forests against fire (PNDFCI))	Regional Plan for Forests (PROF)	Regional Forest Management Plan (RFMP)
Territorial**/district (supra-municipal)	Consolidation at decision-maker level for public forest and protected areas (management plan entity)	NO TOOLS	Local strategy of forest development: (voluntary) Forest territory charters; massif development plans	Territorial Forest Plan (TFP)	NO TOOLS	(RFMP)

(continued)

Table 1. (Continued)

Geographic level	Country's tools (programs/plans)					
	Belgium (for WR only)	Finland	France	Italy	Portugal	Slovenia
Municipal	NO TOOLS	Municipal Forest Plans for forests owned by municipalities (MFP)	Management Plans for forests owned (limited to public forests)	NO TOOLS	(Municipal plan for defense of forests against fire (PMDFCI))	(RFMP) and Forestry unit management plan (FMUP)
Local (holding/farmer/estate/compartment/stand)	Management Plan for public forests and/or protected areas (Management plan unity) simple Management Plans for private owners (voluntary)	Holding-level forest plan	Forest Management Plans for public forests, Simple Management Plans for private forest	Forest Reorganization Plan (FRP)	Management Plan for private forests (PGF)	FMUP and Forest Siivicultural Plans (FSP)
				Forest Management Plan (FMP)	Management plan for communal forests (PUBS)	
				Forest Production Management Plan (FAP)	Management plan for private and communal forests (ZIFs)	

\*According to the administrative/non-administrative division of countries at the sub-national level (see Figure 2).

\*\*According to a sub-regional division (see Figure 2 and Note 6).

the general strategies compatibly with the specific regional, sub-regional, and local situations.

Among the European countries studied here, at least the national level and the local/stand level are always present. We move from the NFP to the Local or Holding-level Forest Management Plans (FMPs). Moreover, all countries have Regional Forest Programs (RFPs), which are usually linked to the sub-national administrative division of each country (i.e. NUTS of level II – Nomenclature of Territorial Units for Statistics by regional level) (Figure 1). At the higher levels, only the WR of Belgium does not still

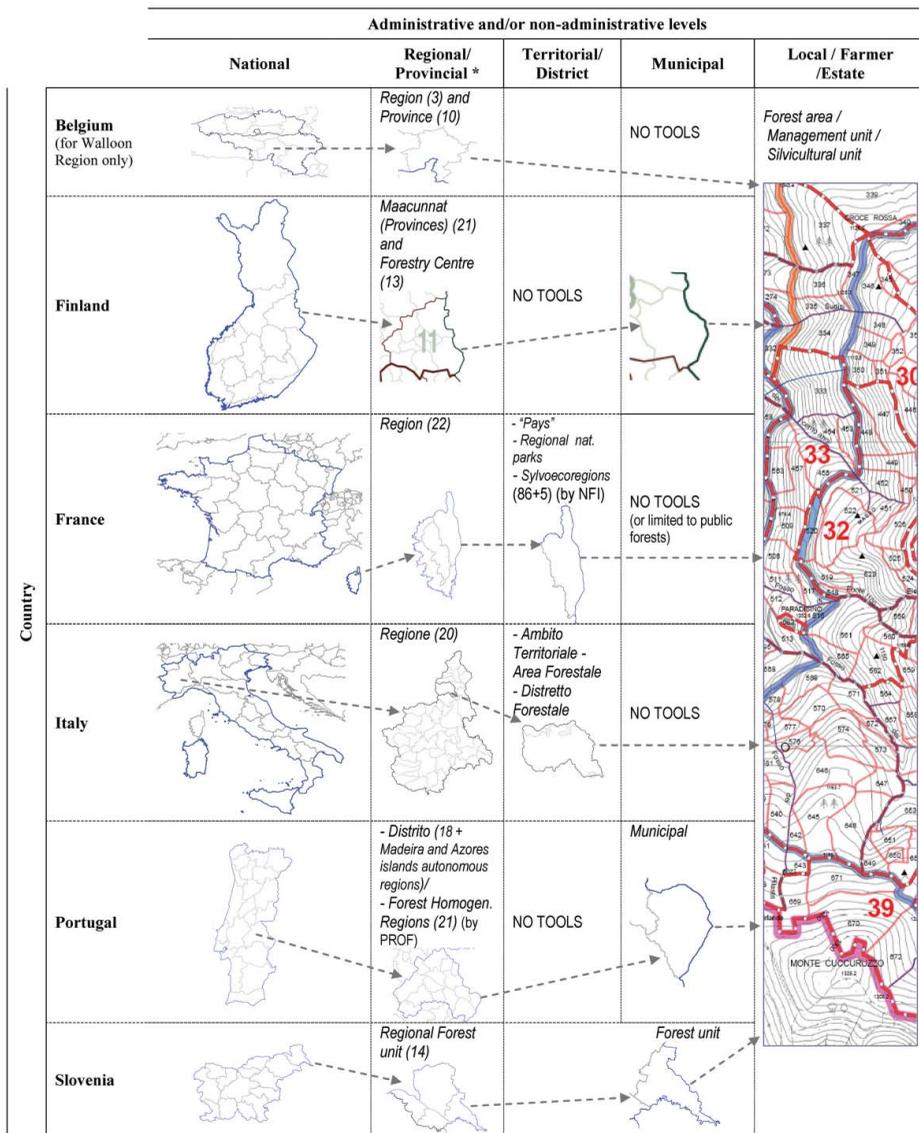


Figure 1. (Colour online) Hierarchical hypothesis of the forest planning and related geographic administrative and/or non-administrative division of the analysed countries.

have an NFP or RFPs; instead, the forest sector is included as a specific chapter in the broader environmental sector plan (e.g. Environment Plan for Sustainable Development).

Other levels exist between the regional and local levels (Table 1): a “territorial” (supra-municipal) level and a “municipal” level. The municipal level of forest planning exists in several countries: Finland, Portugal, Slovenia, and France (only for public forests). This level usually refers to the administrative borders of municipalities and/or forests owned by municipalities themselves within these borders. For instance, in Finland, this planning process is exclusively related to public (municipal) property, where more emphasis is now placed on goals related to recreational use. In comparison with the planning of private forests, the participation of citizens in municipal planning processes is common today (e.g. Löfström *et al.* 2010). In contrast, the government in Portugal has been incentivizing the creation of technical forestry offices in all Portuguese municipalities to coordinate the national planning system with the local level, particularly for fire prevention and timber-related goods. Therefore, some of the most important issues in forest policy, such as forest fire prevention, have been tackled at the municipal level.

The difference between public and private forest ownership must be taken into account in highlighting differences among countries. In the WR of Belgium, for example, where 53% of forests are private, no local forest plan is mandatory or required for private forests. In Slovenia, 74% of forests are private properties; forest plans are designed for all forests by the forest service, but private owners are not obliged to implement them. In Finland, forest owners are not obliged to adopt a forest plan, and if the holding has a forest plan, the owners are not obliged to follow it. In Portugal, private holdings account for more than 80% of forest area, and management plans are incentivized but not compulsory. However, in some situations, such as in commonly owned forests, the forest plan is obligatory.

France, Italy, and Slovenia have also adopted planning tools at the territorial level (see Table 1 and Note 6). For example, in France, the massif development plans organize grouped equipment and cuttings in private forests at the scale of several municipalities (approximately 5000 ha), as road network schemes organize access over the long term. At a coarser scale (50,000 ha), territorial supply plans and maps are used to assess the resource and the consumers to organize its use. At this coarser scale, forest territory charters are strategic documents elaborated to organize multi-functional actions. All these documents are voluntary for administrative entities. There is no systematic coverage, and the process is still bottom-up, but it is now organized at the regional level according to priorities (pluriannual forest development plans). In Italy, from the legislative and methodological standpoint, this level of territorial/district planning does not yet have a clear, well-defined regulatory framework at either the national or the regional level. However, the territorial planning, as applied in some Italian regions, would force the local administrators (e.g. municipalities) of a given forest area to create a platform of cohesion with respect to an asset – the forest – that would otherwise be considered and managed in a fragmented way regardless of a univocal territorial-level environmental strategy (Cullotta and Maetzke 2010). All of this is only possible if there is a strong partnership among all the communities in a given area (and only then if this partnership acts in an environment of appropriate incentives and regulations). This necessity is particularly evident in areas where forest resources are very fragmented in their distribution. In the WR of Belgium, an intermediate level is available on a voluntary basis, for strategic planning.

Although all of the countries analyzed here have forest planning tools for the local level, the countries vary widely in terms of the percentage of forest coverage, with high coverage in countries where economic silviculture is important (e.g. Slovenia), while other countries, such as France and Italy, have different historical forestry traditions exhibiting lower coverage. In countries with lower coverage, an intermediate upper level (territorial) could be more suitable for the management of larger areas.

### **3.1. Creation of forest programs and forest planning: from the strategic to the tactical level**

Table 2 synthesizes the main goals of developing a forest program/plan according to the geographic level. Note that using the international and shared system of naming these tools, we move from NFPs to Local Forest Management Plans: from programs to plans. While programs consist of more general goals and actions that are not necessarily targeted to specific areas or stands, forest plans contain operations designed for certain spatially explicit areas.

However, the correct use of these different terms in the international sphere is not always clear in all countries (Carbone and Savelli 2009). For instance, the NFPs in Italy and Portugal are referred to as “Piano Forestale Nazionale” and “Plano de Desenvolvimento Sustentável da Floresta Portuguesa”,<sup>7</sup> respectively. The distinction between program and plan is lost, at least in the naming. Nevertheless, given the different meanings expressed by the terms program and plan and the processes used to develop programs and plans, it is appropriate to highlight the differences in geographic levels and related aims.

Forest programs and plans have different strengths and are intended to cover different time spans and different areas. Programs address a strategic or long time span and give the same importance to the various goals over the period of validity of up to 10 years or longer (Hoogstra and Schanz 2009). Planning (or tactical) activities span a shorter period (three to five years) with compulsory cultivation guidelines and only address long-term goals in a general way. The long-term content of the plans mainly focuses on checking the functional results of the interventions established by the plan. Thus, planning activities require a limited spatial reference within clear boundaries, including maps indicating the locations of the planned operations (Tittler, Messier, and Burton 2001).

Therefore, from the upper levels to the local levels (municipal, local/estate), the forest tools range from programs and guidelines to operative and stand management indications. The in-between territorial level may be the most ambiguous, and approaches to this level are still evolving. Bottom-up approaches may be limited to programs of more or less harmonized actions, fostering the commitment and cooperation of actors in a first phase before a more integrative planning process based on maps. In a more specific top-down approach, the territorial plan will simply be a map for the application of general guidelines defined at the regional/district level. In France, these two approaches are illustrated by the forest territory charters, which are bottom-up strategic participative and multi-functional processes, and the massif development plans, which apply regional and national guidelines for wood harvesting through local operational maps.

Both approaches, the strategic top-down approach (developing programs) and the operational bottom-up implementation (planning), are bound to be interactive. However, this virtuous interactive process with readjustments every 10–20 years, which is the basis of forest planning at the local scale, is not easy to foster at higher levels in countries where the bottom-up approach is applied, because of the number of actors involved.

Table 2. Synthesis of main goals of forest program /planning tools according to the geographic level.

Geographic level	Denomination of tools	Main goal	Source of information	Short description and importance
National	National Forest Program (NFP)	To organize national forest policy	Mainly NFI data (from sample plots)	International commitments consider the NFP as the tool for implementing the SFM, as set forth in the UNCED Forest Principles and Helsinki HI Resolution. The MCPFE defines the NFP as a method for inter-sectoral and iterative planning, implementation, monitoring, and evaluation at the national level and /or regional level. The NFP needs a participatory and inter-sectoral approach as well as a permanent institution in order to be able to achieve long-term goals.
Regional	Regional Forest Program (RFP)	To organize regional forest policy	Regional Forest Inventory (RFI), Regional Forest Map, data synthesis database of upper level (NFI)	The public administrations (usually at the administrative regional level (see Table 1) set forth the guidelines for environmental and forest policy, the economic – financial strategies (e.g. Rural Development Plan) and the organization models for the forest administration in a long-term programmatic document, the RFP.
Territorial /district	Territorial Forest Plan (TFP)	Contextualization of supra-municipal framework and addressing of forest functions	Thematic maps (land uses, forest types, forest functions, management units, etc.) and database synthesis of upper and following levels	The territorial planning level has the objective to produce a set of contextualized guidelines for forest planning of an area that usually encloses different municipalities of a specific physiographic /land catchment. The planning guidelines include the entire range of the forests' multiple-functions, as well as those of other forest resources (pre-forest areas, pastures, most important natural environments with close ties to the forest, etc).

Municipal	Municipal Forest Plans (MFP); FMUP; PMDFCI	Contextualization of municipal framework and addressing technical application of forest	Compartment/management data unit, (multi-source) NFI and RFI data	This level usually refers to the administrative borders of municipalities; municipal forest plans are drafted for forests that are located within the borders. Often this planning process is exclusively related to the public, while plans of private forests are related to the local level.
Local (holding/estate/stand)	Local Forest Management Plans ( <i>sensu lato</i> )	Operational plans of local/stand forest management practices	Local and detailed data inventory, detailed thematic maps, management/compartment unit assessment	Operational management tools for implementing silvicultural methods in the given local area over time. It defines the spatial and temporal distribution of technical management practices at forest stand (often, also including closed important habitats and/or protected areas). Within each country, differences in the local planning approaches are usually observed comparing administrative regions.

These adaptive architectures are only now under construction at the territorial level, with a wide variation in the level of achievement (Kato and Ahern 2008).

Finally, in this overview, it is important to note that moving from northern to southern Europe, forest program/plan processes devote increased attention to forest fires (e.g. Portugal and Italy) (Table 1). At the municipal level in Portugal, forest sector planning is fully devoted to this issue (municipal plan for the defense of forests against fire).

#### **4. Relationships and the degree of integration with other tools of land-use planning: the heterarchical logic (vertical and horizontal)**

The forest is only a *tessera* of the complex environmental mosaic: developing programs and managing this relevant but single part must fit together with the various other programs/plans related to land use. In the above reported hierarchical logic of forest planning, the various stakeholders must debate the foremost aspects of the available and/or operative program/plan at different levels.

This highlights the importance of an inter-sectoral and harmonic relational framework among planning tools for forests and other sectors of environmental/land-use planning, including landscape programs and plans, agriculture/rural development tools, urban planning, hydro-geological land protection, regional programs on energy use and development, and protected areas/nature conservation tools.

The relevance of enhancing fully operative cross-disciplinary links is underlined in the Principles of the Agenda 21 – Chapter 11 (United Nations 1992), which explicitly expressed the need to make inter-sectoral connections and highlighted the following principles of forestry planning: co-operation, co-ordination, decentralization of decision-making, inter-sectoral coordination, and reviewing (Bell and Evans 1998). More recently, the COST Action E19, analyzing the basic frame of an NFP (the most important forest planning tool at the national level), indicated among the main fundamental points the necessity of a “holistic and intersectoral co-ordination” (Glück and Humphreys 2002, 255).

This fundamental or basic principle can be viewed as an expression of the “heterarchical governance mode” (Pülzl and Rametsteiner 2002, 262 and 261), which we can define as “a co-operative and deliberative idea that follows a more interactive logic (vertical + horizontal), in an attempt to give attention to others and in relation with the program/plan level”. In other words, this more integrated use of forest program or plan aims to find links and synergies among sectors to enable the sustainable use of environmental resources (water, air, agriculture, forestry, etc.).

Regarding the implementation of international commitments to enhance SFM, Pülzl and Rametsteiner (2002) underlined the shift from the hierarchical to the heterarchical mode of governance that has taken place in natural resource planning. Comparing the two different approaches, the hierarchical mode (vertical logic) focuses primarily on the forestry sector, despite its stated aim of being inter-sectoral, while the inter-sectoral approach is the more appropriate holistic mode of planning for solving forest problems (heterarchical in a synergistic horizontal logic).

Currently, however, true inter-sectoral connection among planning tools is not always achieved. This gap or incomplete coordination of forest planning with the other territorial and land planning seems to be common to several European countries (e.g. Başkent, Köse, and Keleş 2005; Montiel and Galiana 2005; Fidelis and Sumares 2008; Cullotta and Maetzke 2009; Fürst *et al.* 2012).

As shown by the case-study in Figure 2, the inter-sectoral connections among planning tools are heterogeneous among European countries and are not easy to summarize. Some considerations can be made at the regional (or subnational non-administrative) level (Figure 2(a)) and at the municipal /local level (Figure 2(b)). Note that only some of the reported connections in Figure 2 are compulsory and derive from legal requirements. The majority of the connections are indicated based on the usual procedures in each country. This figure reveals a widespread lack of hierarchical and heterarchical rules in most countries. For instance, in Italy, according to specific laws, at the local level, the forest planning tools are subordinated to the protected area plans, while urban town plans are subordinated to forest plans.

At the regional level, forest programs such as RFPs interact with related tools and the Regional Development Programs on agricultural and rural development in different ways in different countries. The goals and actual operations that are included in these regional plans should be in line with and support each other. For example, in France, agriculture takes precedence in rural development, and forests are not integrated, as, up to recently, they had their own financing system, the National Forest Fund. The aim of forest territory charters is precisely to foster this integration.

Stronger connections seem to exist between the forestry and protected areas/nature conservation sectors (Figure 2(a)). For instance, in all countries, these sectors have a mutual influence during the planning process: e.g. forest management operations are prohibited in those areas or are only carried out in support of natural processes. In addition, current legislation on nature conservation institutionally influences forest planning in many countries (e.g. Slovenia, France, Italy), according to a multi-functional

a) for the Regional / or Sub-national non-administrative level:

Forest planning ↓	Other sectors of environmental/ land-use planning					
	Landscape	Agriculture/Rural development	Hydrogeological	Energy	Protected areas/Nature conservation	Urban- plan
Belgium (WR only)	N	↙	↙	N	↙↗	↙
Finland	N	↗	N	↙ and ↗	↙	↙
France	↙	↙	↙	↗	↙↗↗	↙
Italy	↗	↗	↙	↗	↙↗↗	↗
Portugal	↙	↗	↗	↙	↙	↙
Slovenia	↗	↗	↙	↗	↙↗↗	↙

LEGEND:

Full connection :  
 Forest planning prevailing ↗  
 Other sector planning prevailing ↙

Partial connection  
 Forest planning prevailing ↗  
 Other sector planning prevailing ↙

N : none

b) for the Municipal/Local level:

Forest planning ↓	Other sectors of environmental/ land-use planning					
	Landscape	Agriculture/Rural development	Hydrogeological	Energy	Protected areas/Nature conservation	Urban- town plans (masterplan)
Belgium (WR only)	N	↙	↙	N	↙↗↗	↙
Finland	N	N?	N	↙ and ↗	↙	↙
France	N	↙	↙	N	↙	↗
Italy	N	↗	N	N	↙	↗
Portugal	N	↙	↙	N	↙	↙
Slovenia	↙	↗	↙	↗	↙↗↗	↙

Figure 2. Presence /absence of a real connection (integration) in planning between the forestry and the other sectors of environmental land use in several European countries and relation according to the prevailing decision (forest tools prevail to other sectors, and vice versa, according to specific laws or usual procedures working into each case-study).

forest management paradigm, while in Finland, water protection can be improved by planning different forest management operations, as well as by creating more efficient planning tools (Finér 2007).

Partial inter-sectoral connections with other sectors are also evident (urban, energy, hydro-geological, landscape). For example, in Finland, the goals of the forestry and energy programs are, to some degree, dependent, but the processes used to create these programs do not interact adequately with each other. The organizational relationship with respect to the regional programs often cannot be clearly defined. Many of these tools interact with and affect each other, but the interaction can be in either direction (Figure 2(a)).<sup>8</sup>

The integrative concept of a “Green Network” is a new multi-scale and inter-sectoral approach to better planning protection/conservation policies with respect to other policies, including urban and hydro-geological policies, by combining strict areas of protection and nature-oriented connections in a general functional multi-scale framework. This approach is being implemented in France as the “Grenelle de l’Environnement” under the name of the “Trame verte et bleue” (green and blue framework), establishing a fundamental link to the urban network as will be taken into account in urban documents.

The inter-sectoral coordination among different planning tools seems to be different at the municipal/local level (Figure 2(b)). At this level, inter-connections are confirmed among forestry and protected areas/nature conservation, while the forestry plan is not connected with the agriculture/rural development sectors. For example, in protected areas and Natura 2000 sites, forest planning is subordinated to the specific purposes of protection.

Moreover, forest planning influences and is influenced by local urban planning processes: e.g. in a town master plan, the forest areas influence the map of zoning uses (i.e. new house construction is usually not allowed, or is very limited, in the areas covered by forests or natural vegetation).

The lack of connections between forestry and the other analyzed sectors worsens at the local level, with limited connections between the forest and the energy and landscape plans. Nevertheless, a new voluntary tool is emerging at the territorial level in France: the territorial supply plan, which assesses the sources of and demands for fuel wood to organize the harvest, processing, and use of the resource. These plans, fostered by forest owners (notably also by forest communes), appear to be a useful tool to maintain forest planning at the local scale. In fact, these plans are in competition and often in contradiction with other resource plans at regional scales, based on large-scale National Forest Inventory (NFI) evaluations, and generally promote higher levels of harvest.

In general, Slovenia seems to have the best integrated inter-sectoral dialogue in environmental/land-use planning, with other countries exhibiting intermediate levels of horizontal dialogue. The development of an inter-sectoral framework is also stimulated by the evolution of forest planning from the forest stands concept to the more “global habitat concept”. Thus, the object of forest planning, long defined based on wooded species and forest stands, is shifting to a more integrative and interoperable concept. In some EU countries (e.g. the WR of Belgium), the basic element of forest planning is now the habitat type of the European EUNIS habitat typology. This choice allows for the planning to be extended, for example, to open habitats such as wetlands, and facilitates connections between sectors. This is confirmed by the greater degree of inter-connections among the forestry and protected areas/nature conservation sectors observed in the study cases.

In addition, the absence or weakness of the connection between the forestry and the other planning sectors could often be due to the differences among geographic limits referred to by the different sectors. For instance, although Portugal does not have formal regions as administrative bodies, the country has several sub-national divisions; however, they do not have formal recognition and do not house governmental bodies. The forest plan includes the PROF (Regional Plan for the Management of Forests), which identifies planning units named “homogeneous regions” (Table 1 and Figure 1). As far as forests are concerned, the defined PROF regions do not necessarily correspond to the territory included by other planning tools (Carvalho-Ribeiro, Lovett, and O’Riordan 2010). Similar considerations apply to the sub-regional (territorial and local) level in Italy, where non-coincidence among geographic limits exists among the forestry, landscape, and hydro-geological sectors (Figure 2(b)). In France, the new NFI method, with fewer sample points and simplified maps, leads to a lack of visibility at the territorial level, as statistical elements at this scale are represented only by rather broad homogeneous ecological districts, distinct from administrative units.

## 5. The influence of EU policy on the development of forest planning

The EU does not have any direct competence in forest policy, leaving it instead to the member states, respecting the complex diversity of ownership, local wood policy, history and traditions, and differences in local approaches to developing programs and plans. However, forests are related to the critical subjects of the environment, landscapes, and social issues, and cover 32% of the land area of the EU (excluding the Russian Federation). As a diverse resource, forests involve many complex issues, such as the fact that they employ five million people and that protected forest areas encompass approximately 39 million hectares (FOREST EUROPE, UNECE and FAO 2011). Moreover, the Kyoto protocol and related issues have attracted attention to the importance of forests as carbon sinks and as sources of biomass fuel. Directives and regulations from common EU Environmental Policy and from Common Agricultural Policy (e.g. the Rural Development Plan) had a strong influence on forest management and planning, as well as on land-use planning. In addition to the significant example of Natura 2000 sites, several other EU Common Agricultural Policy (CAP) regulations also strongly influenced the forest sector, such as the 2080/92 or the EAFRD, and in some ways, the contribution of the European Regional Development Fund (ERDF) was acknowledged by local program development tools. Such activities were financially supported by the EU through specific funds.

From the point of view of an increase in inter-sectoral planning, the forest sector and its related programs must first be better integrated with agricultural land use. As previously discussed, this is a critical issue for the interface between forestry and agriculture, where traditional agroforestry systems play a pivotal role.

In this regard, the CAP, via the rural development plans, supported the conservation and the enhancement of traditional agro-forestry systems.

In relation to forest planning, consider the Forest Action Plan 2007–2011, adopted on 15 June 2006. This tool influences the allocation of EU Community funds toward the defined objectives within the local regulations. The Plan focuses on four main objectives:

- (1) improving long-term competitiveness;
- (2) improving and protecting the environment;
- (3) contributing to the quality of life;
- (4) fostering coordination and communication.

Those objectives could be achieved by many key actions that could provide the needed impulse to “transform the Strategy into a dynamic process capable of responding to the newly emerging expectations of society” (Commission of the European Communities 2005). The Plan strongly supports SFM as an indispensable tool to achieve the above cited goals and to preserve biodiversity in EU countries. Some tools suggested by the Forest Action Plan, such as technical management support, could be operationally effective in carrying out SFM in practice. Nevertheless, according to Pelli *et al.* (2012, 128 and 129), this specific issue had not an evident impact on forest policy in the Community, although the same authors specify that it “is difficult to pinpoint effects or activities at Member State or Community level that were triggered specifically by the EU Forest Action Plan” and, on the other hand, “There is as such a varied and indirect influence of the Action Plan as an additional driver in other policies processes (e.g. forestry measures in rural development programmes, forest-based resources in bioenergy strategy ...). In addition, the Action Plan allowed for synergies with pan-European processes, especially Forest Europe”.

In the countries studied here, the EU policy influences the forest sector in different ways, depending on the location of the country within Europe. The significant differences in forest management between European countries are somehow neglected in some EU directives. There are some concerns that EU forestry policy could be too uniform. Some examples are described to illustrate the previous statement.

Finland has implemented a variety of forest-related EU projects, and specific funds have been allocated for these projects. The EU strategy and policy agreed upon at the 1993 ministerial conference in Helsinki resulted in a commitment to SFM in Europe. As a result of this commitment, practical forest management in Finland began to consider biodiversity, and the forest law was changed to accommodate biodiversity.

In Portugal, EU policies have influenced developments in forestry in both negative and positive ways. Some problems related to the “development” across the Portuguese territory that was financially supported by the EU Regional Development Plan through the ERDF, the European Agriculture Guidance and Guarantee Fund (EAGGF), and the European Social Fund (ESF) created tensions between agriculture and forestry and urbanization pressures (Fidelis and Sumares 2008). At the same time, EU-driven policies such as the Law of Environmental Base, enacted in 1987, had the opposite effect, helping to enforce awareness of environmental issues in Portugal. In the same way, the fourth environmental program (1987–1992) tackled environmental issues such as the prevention of pollution and the improvement of natural resource management. Despite such efforts on environmental issues and despite the enforcement of environmental awareness, economic development funds such as ERDF and EAGGF had major impacts on the Portuguese landscape (Andresen and Castelbranco 1993).

Regarding Slovenia, EU environmental policy had a remarkable influence on forest management and forest planning. Natura 2000 sites are a significant example of this influence. Thus far, Slovenia has held the highest share (approximately 50%) of the total forest area of Natura 2000 sites. Forest plans became a mechanism of management for those Natura 2000 sites lying mainly within the forested area. However, changes (adaptations) in forest plans were required along with an intense collaboration with nature conservation organizations. Some international documents and actions support the success of close-to-nature forestry in Slovenia, e.g. MCPFE, Agenda 21, CBD, UNFCCC and UNCCD, UNFF7, NLBI, and the EU Action Plan for forests. A similar process could be implemented in Italy, where planning tools have recently been adopted in protected areas (Natura 2000, natural parks and reserves).

In France, at the local level, although the Groupes d'Action Locale (GALs) have not often addressed forest issues in the LEADER+ territorial projects, the impulse toward more territorial approaches is useful for forest policies. For example, forest projects in SLDF (territorial forest charters and massif development plans) have been financed by the FEADER through the French Rural Development Regulation (RDR). In fact, successive European policies have had rather contradictory effects on French forest policy by strongly disrupting the prevailing centralized system, which has notably been built around the National Forest Fund (FFN) since 1946. The FFN was closed in 2000, and the process of innovation by destruction and creation is still underway. New centralized funds perturb the system in the sense that they generally address investments that are easy to program, plan, and control, and they are only progressively adopted by the system at the local level in a second phase.

## 6. Discussion and conclusions

### 6.1. Lessons learned from the case-studies

The framework of the forest program/planning process in the European countries analyzed here is highly heterogeneous. The nationwide organizational pattern differs widely between different levels of programs/plans and between various geographic levels. As shown in Table 1, the pillars of planning are the upper (national) and lower (estate) tools that have been adopted in all countries, except for Belgium, which continues to use different tools due to its strong regional undercurrent. Between these two extremes, some other levels are adopted in some countries to connect the mainly political issues of the NFPs to the operational level. Each studied country has forest plans at the regional level. These political instruments direct the implementation of the guidelines of forest development programs in the specific context of the regional environment (NUTS level II). Tools at the territorial level have only been adopted by France and by some regions of Italy and Belgium. At the municipal (administrative) level, overall public–private tools have been adopted only in Finland, Portugal, and Slovenia, and the planning processes at this level are restricted to publically owned forests in the other countries (with the exception of fire and natural risk management). A planning instrument at those last two levels could be particularly relevant for shared management across a large territory where more actors (public and private owners and stakeholders of various ranks) are directly involved in planning processes (e.g. Buttoud 2004; Cantiani 2012), such as in Italy or France, which have highly articulated distributions of property.

The most complete chain of planning has been adopted by Slovenia, where regional and municipal–territorial level works are linked with each other, completing the logical path from the national view to the application of estate plans.

In general, a functional hierarchy of decision-making across levels is usually intended but is not achieved in every case. For instance, RFPs are usually negotiated with stakeholders and drafted after the upper level NFP definitions, most likely under the effects of the EU Forestry Strategy, which identified the tools for implementing international commitments, principles, and recommendations at these two levels. However, disconnects can occur when the strategy is scaled down to the local level. Often, due to the lack of a link between local technical authorities and policymakers, local forest plans are not well linked to the higher level, sub-regional, or regional forest planning tools, which themselves are derived from national and supranational requirements.

The idea of scaling down policy from national plan to local management implicates various operative difficulties and requires appropriate program tools. The main difficulty is linked to the different approaches of private and public owners. Private owners indeed mainly seek profit by managing their properties, while the public ones should pursue socially useful targets. A possible solution is a targeted use of financial support assured by the use of the ERDF, addressed following the EU Forest Action Plan and distributed by the local authorities.

There seems to be a clear gap between the national and regional levels, on one hand, and the sub-regional and local levels, on the other (Hogl 2002).

Another important issue in regional or sub-national non-administrative planning is the relationship between the various sectors of land-use planning. This means that the level of real cross-disciplinary links among agricultural, urban, landscape, hydro-geological, and other plans should be verified. Moreover, the strength and the statutory predominance of each plan with respect to the others must be clear and defined. Once again, the state of the art varies widely among the countries examined here, and often among regional and local levels in the same country. The analysis of the sample countries shows different trends in relation to specific subjects: for example, energy and landscape are mainly managed at the regional level, while topics such as agriculture, urban planning, and nature protection are subject to multi-level planning. Looking at statutory prevalence, natural and hydro-geological protection planning generally predominates over the tools of other sectors, and urban and agricultural issues surprisingly tend to prevail over forest issues in various countries in operation. This last finding may be partly explained by the twofold nature of forests as a common heritage and project: a distinction has to be made between the protection of forested areas, where the needs of the forest prevail against the needs of agriculture and urbanization, and territorial projects and funding, which generally ignore forests or treat them as a minor concern. Under the pressure of two different users, a logic of segregation rather than multi-functionality is naturally enhanced.

In the European Community, according to the case-studies here, there is a growing need for a closer connection between programs and plans of different topics to better address resources and knowledge toward a well-balanced, efficient, and shared use. Moreover, all guidelines on the allocation of EU funds stress the need for partnership and decision-sharing processes, and overcoming barriers between sectors is critical to achieving this goal.

## **6.2. *The necessity of a real improvement in the planning approach in the EU Community***

The overview of the countries studied here reveals a clearly heterogeneous approach to multi-level and multi-topic planning, with a variety of connections and relationships between tools and levels. This obviously mirrors the peculiarity of each country, following its history, tradition, and utility (Farcy 2004). From the view of the current European Community, it could be made helpful for each country to identify similarities and to adopt a common approach in order to better allocate human resources, knowledge, and economic resources between member states. The heterogeneity is also linked to the fact that these approaches are recent, notably the European forest policy, and the effects are still proceeding in the traditionally slow forest structures. This crucial aspect, which was first generally analyzed in Section 4, reveals a gap in the chain of planning procedures within and among countries, at least in the cases studied here. At this point,

Europe could make a real contribution at the conference or panel level by producing a specific “green paper” suggesting good planning practices, with specific attention given to how the various existing tools can be integrated in a functional system. This contribution must follow a deep analysis of tools and procedures and could be carried out by a commissioned research institution or a panel of experts.

Ultimately, the positive contribution of European policy to forestry is mainly related to the general strategy and the strengthening of SFM, which gives credit and importance to the multi-functional role of forests. The rural and environmental strategies of the European Community must be addressed to protect and enhance forests as essential common goods, and effective integration between sectors and actors in land-use programs/plans processes and monitoring should be emphasized.

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### Notes

1. It is the assumption that a forest – which is managed functionally to maximize wood production – is also capable of fulfilling its other inherent functions, such as hydro-geological protection, recreational use, environmental values, etc. (see various sources, including Patrone 1940; Peyron 2002).
2. Literally: Reforestation Plan.
3. Literally: Forest Advancement Fund.
4. Literally: Portuguese Forest Project.
5. Literally: Forest Action Plan.
6. The sub-regional level can be identified by the term territorial. However, it is important to note that in some countries (e.g. in Italy) a “territorial” planning level is not necessarily linked to a well-defined area – it is in between the administrative sub-national division (different denomination according to the country – [Figure 1](#)) (higher) and estate (lower) levels.
7. Literally, they both use the term “plan” instead of “program”.
8. That is, energy and protected areas/nature conservation programs bias forestry programs or vice versa.

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