

# Strategic Framework on Mediterranean Forests

## Policy orientations for integrated management: of forest ecosystems in Mediterranean landscapes

### Rationale of Mediterranean Forests

Forests and other wooded lands are highly integrated into Mediterranean landscapes. Through millennia, Mediterranean civilizations have been using multiple social, economic and environmental goods and services provided by these ecosystems. As a consequence the present landscapes are the result of a long-term interaction between populations and forest ecosystems. These multiples goods and services provided by forest ecosystems contribute directly to food security of rural population in the Mediterranean.

Important disparities between northern and southern rims of the Mediterranean are the result of both different degree of urbanization, industrialization and globalization of trade and tourism, and distinct population growth rates. As a consequence of socio-economic processes, forest landscapes and uses have suffered strong alterations and pressures (rural abandonment, aging of rural populations, intensification of production systems, etc.) causing drastic changes in vegetation structure and modifying the role of the primary sector in national economies.

In the North, where forestland is mostly privately-owned, vegetation has expanded due to land abandonment and its natural dynamics. The lack of management has increased the risk of wildfires. The anarchic urban development has also damaged several forest ecosystems. In the South, where forests are mostly publicly owned, human pressure on forest resources – caused by dense and poor rural forest-dependent populations – is very high. Overgrazing and overexploitation of forest products like wood fuel are the most frequent pressures causing degradation, or even desertification, in the Mediterranean region. Several eastern countries are in transition between these two extreme situations due to a strong economic growth in the past ten years (e.g. Turkey, Albania and Croatia).

This pressure on Mediterranean forests is now exacerbated by climate change and socio-economic crisis.

An improved regional cooperation (North-South and South-South) is key to cope with these new challenges.

## 1. Mediterranean forests provide valuable goods and services

Mediterranean forests ecosystems are composed by forests (25.5 million hectares based on FAO-FRA remote sensing survey 2011) and other wooded lands (about 50 million hectares) which are strongly interconnected with urban and agricultural/rural areas.

**Figure 1: Map of Mediterranean forest ecosystems.** Source: State of Mediterranean Forests, 2012 (Mediterranean forests are represented in green, Other Wooded Lands are represented in yellow and the orange limit represents the Mediterranean bioclimatic limit. Quezel - 1985)

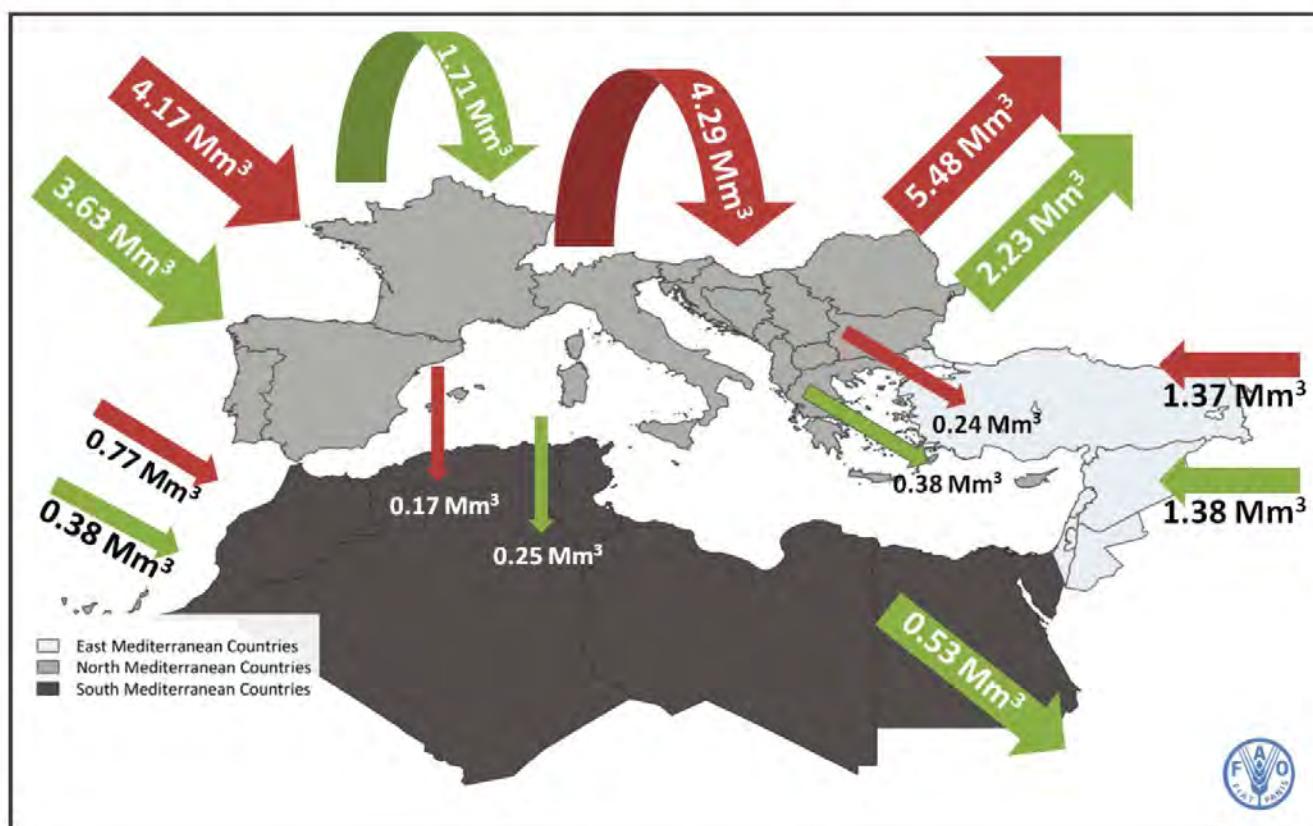


Mediterranean forests are well known for the extraordinary variety of goods and services they offer, and communities they sustain. Landscape quality, soil and water protection, erosion and desertification control, carbon sequestration, biodiversity conservation, wild-life and hunting, wood and non-wood forest products and recreational activities are some of the appreciated services and externalities provided.

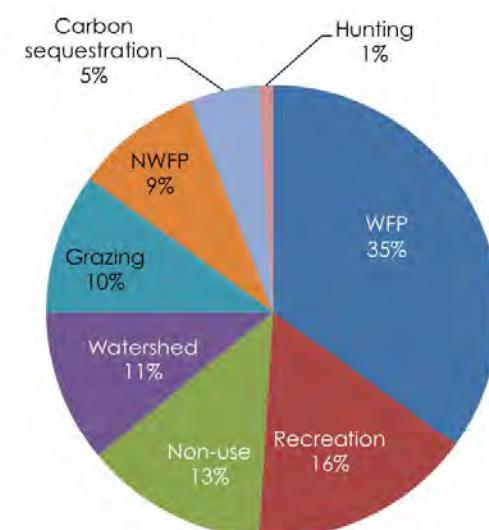
The production of woody forest products is far from being negligible and represents 35% of the total economic value of Mediterranean forests (See Figure 3). Nevertheless it is not enough to meet the needs of the region, which remains a net importer of wood and wood products (See wood flows in the Mediterranean region in Figure 2). In 2010, Mediterranean countries have collectively imported wood products of a value greater than 40 billion USD. Eighty percent of this total (32 billion USD) has been imported from non-Mediterranean



**Figure 2: Representation of flows of round wood (in red) and wood-based panels (in green) within the Mediterranean region and with other regions (in millions m<sup>3</sup>) in 2010 . Source FAOSTAT and UNECE/FAO**



Mediterranean forests are also recognized for the extraordinary variety of non-wood forest products used by local population (e.g. cork, medicinal and aromatic plants such as thyme and rosemary, berries, carob, pine nuts, mushrooms and honey). The production of commercial, non-commercial and self-consumable goods, as well as the management and protection of the ability to deliver environmental and social services, offer job opportunities. This employment generates direct income (marketable goods and services), shadow remuneration (self-consumption) and indirect income through connected products (tourism services, increase values of houses).



**Figure 3: Composition of the total economic value of Mediterranean forests.** Source: Merlo and Croitoru, 2005).

NWFP: non-wood forest products - WFP: wood forest products - non-use: bequest and existence value.

## 2. The Mediterranean: a challenging context

### 2.1. Increasing pressures on the environment caused by demographic and economic trends

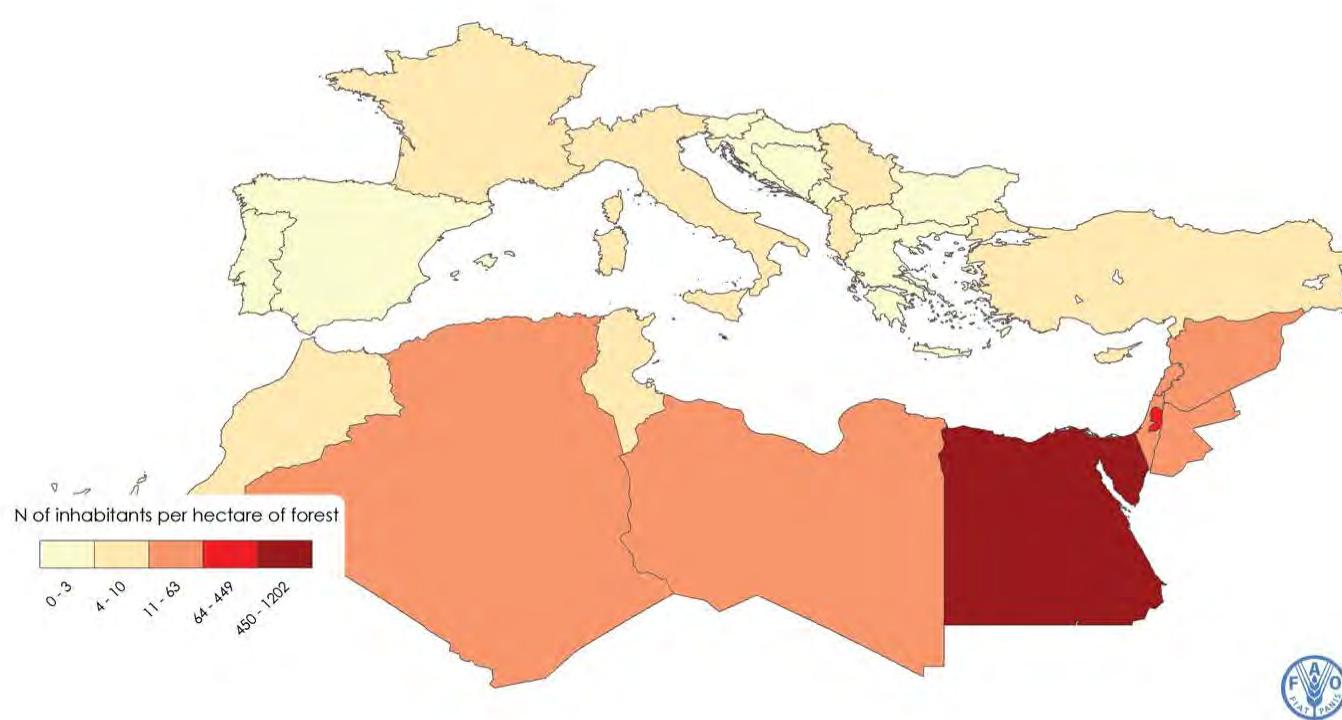
The Mediterranean, with over **500 million people** across three continents (Europe, Africa and Asia) and a rich cultural and natural heritage, is an ecoregion with a specific climate, where environment and societies have evolved together for centuries. The Mediterranean climate is characterized by mild winters and hot, dry summers. Precipitations are concentrated in autumn, winter and early spring. Winter temperatures only occasionally go below 0°C at sea level, whereas at high altitudes (e.g. Taurus Mountain in Turkey and the Atlas Mountains in Morocco and Algeria) snow and lower temperatures are common.

**Mediterranean population is expected to increase up to 625 million inhabitants by 2050** (Plan Bleu, 2012). Due to decreasing birth rates in European countries, population growth is now occurring mainly in southern countries, and particularly **in urban and coastal areas**. This pattern is having strong impacts on the environment and causes major challenges to food and water supply.

Human activities are threatening more and more natural resources (evolution of ways of life - climate change), which questions sustainability of current uses of Mediterranean landscapes.

**Figure 4: Number of inhabitants per hectare of forest in the Mediterranean basin**

Source of data: FAOSTAT and FAO Forest Resource Assessment 2010.

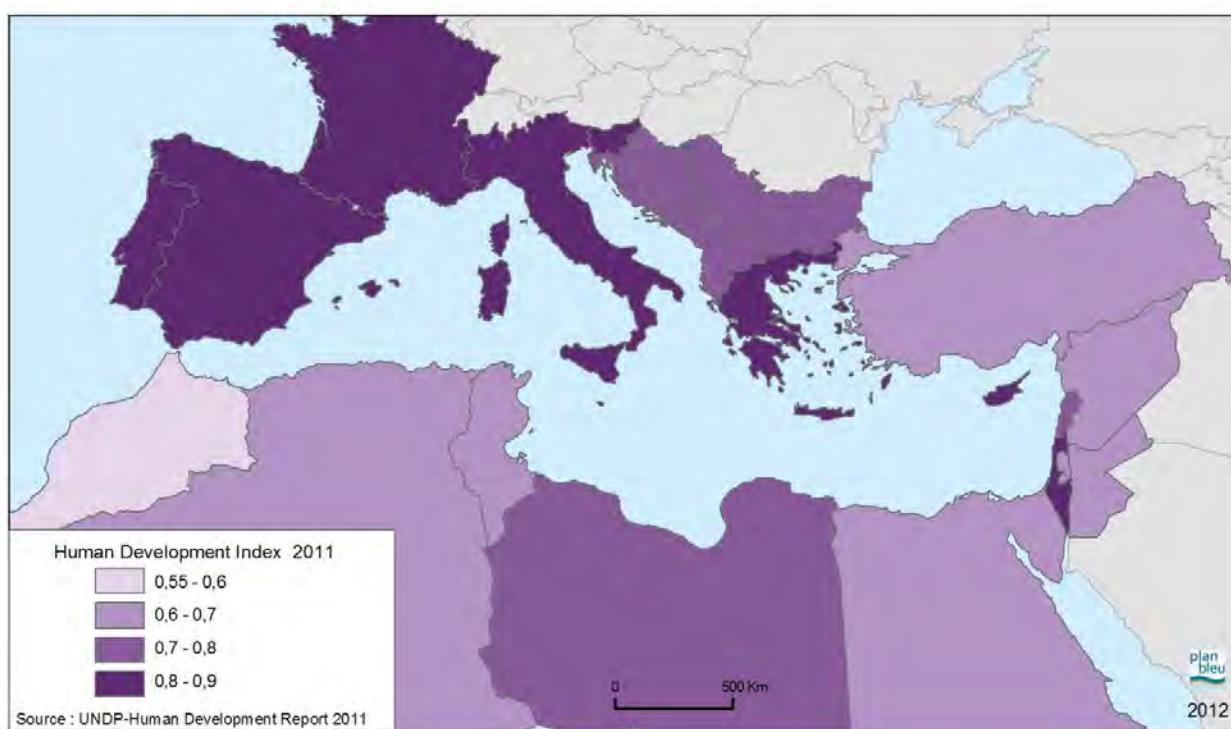


The numbers of inhabitants per hectare of forests highlight the human pressure on forest ecosystems (See Figure 4), particularly in the southern Mediterranean where population density per hectare of forest is very high.

The socio-economic situation of Mediterranean countries is also very contradictory with levels of Human Development Index between 0.55 and 0.9 (Figure 5). Consequently, we can observe different expectations among Mediterranean populations regarding forest ecosystems (recreational areas, biodiversity conservation, soil protection, fuel wood production).

**Figure 5: Human Development Index 2011 in the Mediterranean region.**

Source of data: UNDP Report 2011 and Plan Bleu.



## 2.2. A fragile region strongly hit by climate change

Climate change is already a reality in the Mediterranean. The observed and forecast effects, with increasing climatic and weather extremes, are adding new threats and risks to cope with. These factors reinforce the already existing pressures, degradation phenomena and the vulnerability of Mediterranean ecosystems and populations.

### The Mediterranean basin: a climate change "hotspot"

By 2100, the Mediterranean climate is set to change with temperatures rising by an average of 2°C to 4°C, while rainfalls drop by 4% to 30% and sea level increases by 18 cm to 59 cm (IPCC, 2007, Plan Bleu, EIB, 2008). Mediterranean countries are particularly vulnerable to effects of climate change due in particular to increasing degradation of their water resources (overuse, pollution, salinification, drop in rainfall) and increased demand in the agricultural, urban and energy sectors. According to climate scenarios, some Southern and Eastern Mediterranean countries (SEMCs) could see their available water resources fall by a factor of 4 due to drop in average rainfall (World Bank, 2008). Likewise, increasing spatial and temporal variability in rainfall distribution will lead to an increase in extreme events (floods, heat waves, droughts,) and associated risks in terms of economic losses and human lives. Such changes are likely to have significant consequences at the environmental, economic and geopolitical level, especially in Southern and Easter Mediterranean Countries.

During the 20th century, with an evident acceleration since 1970, climate change has led to an increase of temperatures of about 2 °C in the south-western Europe (Iberian Peninsula, southern France). This elevation of the average temperature also concerned North African countries.

The Mediterranean has experienced a rainfall decrease of up 20% in some regions of southern and eastern rims. It is expected that ongoing climate changes will continue and increase in the Mediterranean region in the next decades, mainly altering air and sea temperatures and precipitation patterns (with more irregular distribution of rainfall as explained in the box 'The Mediterranean basin: a climate change hotspot').

As a consequence, important and sometimes irreversible changes have been affecting the Mediterranean environment especially those wooded lands particularly fragile because close to the limit of their ecological range distribution. Many important economic activities and human settlement in the region are and will be more and more affected by these changes.

### **3. Mediterranean landscapes facing new threats and pressures**

Climate change and anthropogenic activities are rapidly weakening Mediterranean forest ecosystems resilience, increasing land and forest degradation, loss of renewable resources and loss of biodiversity. The increase in magnitude and frequency of climate or weather extremes is exacerbating threats and risks affecting forest ecosystems.

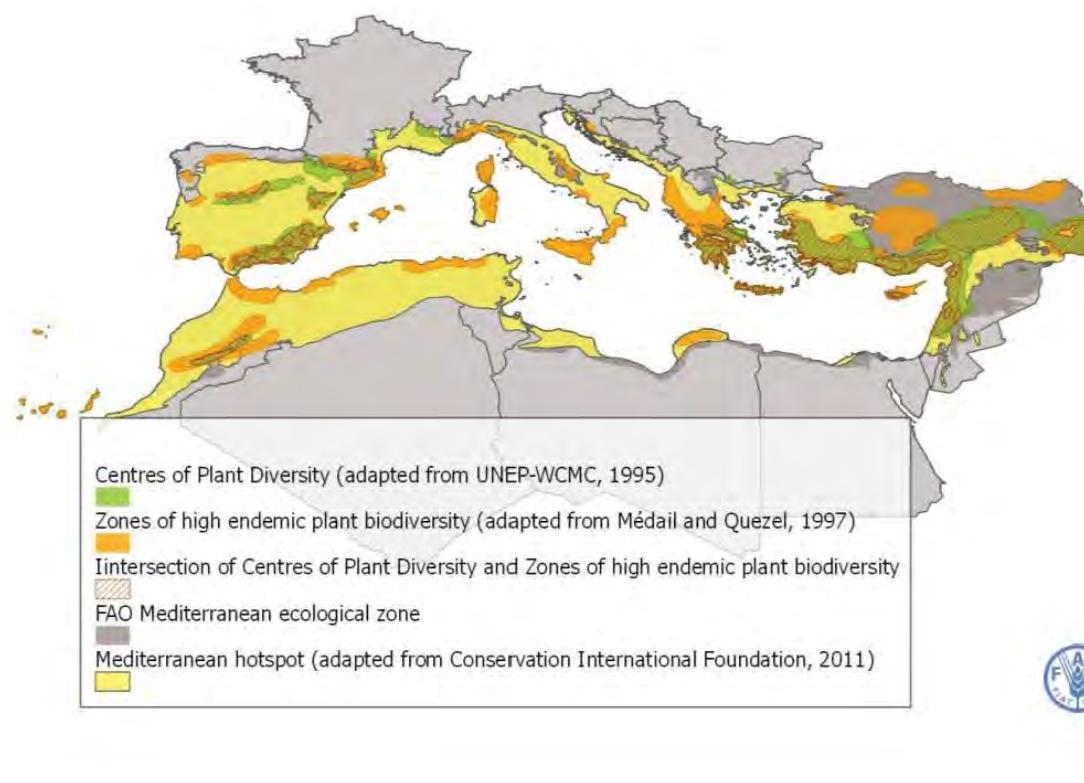
Even if ecosystems responses to a strong increase in temperature and in climate aridity are difficult to predict, it is certain that the loss in biodiversity, desertification, water scarcity and risk of forest fires and health damage will aggravate by the next decades.

#### **3.1 While loss in biodiversity is already under way, forest genetic diversity is crucial for adapting to climate change**

The Mediterranean is a biodiversity hotspot with high biologic diversity and endemism rates. It has over 25 000 plant species (compared to only 6 000 species in central and northern Europe), and about 250 arborescent species, among which 150 are exclusively or preferably found in the region (endemic). In addition, 15 genera are specific to Mediterranean forests (Scarascia-Mugnozza et al., 2000). According to the IUCN Red List, about 124 plant species found in forests of Mediterranean countries and about 18% of almost 3 000 species of different taxonomic groups are endangered.

The Mediterranean region is also a key area for conservation and differentiation of European gene resources and, therefore, it is also considered as a hotspot of gene diversity. Conservation of forest genetic resources is recognized as vital as it provides the basis for the evolution of forest tree species and for their adaptation to current global changes. Only few studies in the past decades have focused on genetic diversity of Mediterranean species but recent research networks (e.g. Euforgen and Silva Mediterranea Working Group on Forest Genetic Resources) carry out activities of pioneering explorations, exchanges, evaluations and conservation of Mediterranean forest genetic resources.

**Figure 6: Biodiversity hotspots and centres of high endemic plant diversity in the Mediterranean.**  
Source: State of Mediterranean Forests, 2012

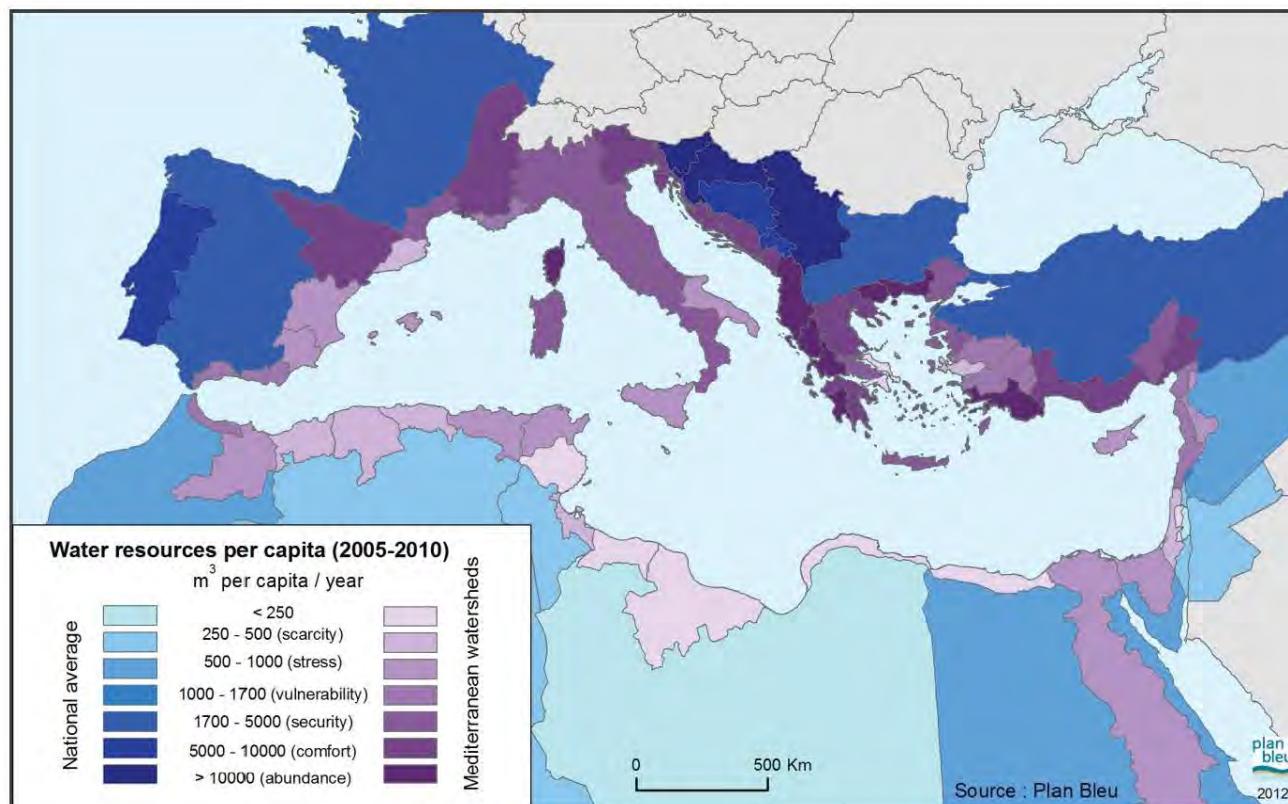


### 3.2. Coping with water resources scarcity

High pressures on water resources are already calling for rationalizing management of water uses and demands in the Mediterranean region. Sixty percent of the world population living in water-poor countries is concentrated in the Mediterranean region. Water scarcity is even more problematic as resources are unequally distributed through the region: in 2009, Turkey, France, Italy and Spain shared 67% of renewable resources in water whereas southern and eastern Mediterranean countries had only a quarter of the available water resources (27%).

The areas affected by water scarcity are expected to increase in the next decades, affecting more and more seriously human well-being, local economies, and aggravating pressures on the environment and land degradation. In particular, high density of trees due to the lack of forest management can increase the vulnerability of forests to water scarcity and other natural hazards such as pests, diseases or wildfires. Forest management should address water scarcity issues, as it can contribute to increase forest resilience to water stress and to find a better balance between water demands from various sectors.

**Figure 7: Water resources per capita in watersheds around the Mediterranean Sea.** Source: Plan Bleu



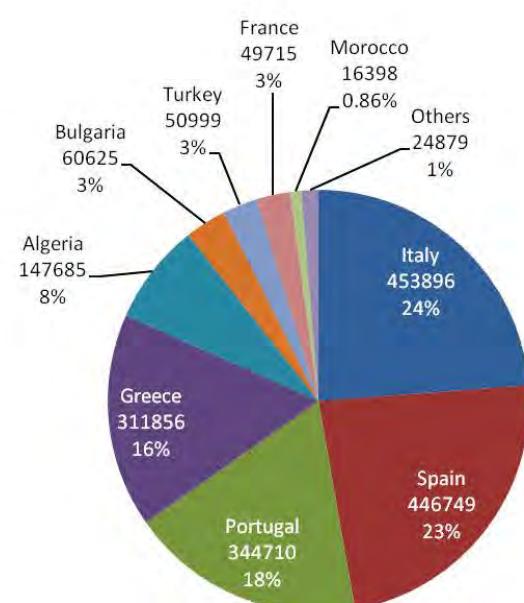
### 3.3. An increasing risk of wildfires over next decades

Lack of land management or rural abandonment over last decades in North Mediterranean countries has caused the development of shrubs and fine fuels that facilitate wildfires propagation.

Wildfires are already a major issue in the Mediterranean region. From 2006 to 2010, the total burnt area was over 2 million hectares with a total number of wildfires in the Mediterranean up to 250 000 (about 54 000 wildfires per year).

Consequences of wildfires are both socio-economic (including loss of human lives, properties and other infrastructures) and ecological (degradation of forest cover and loss of biodiversity). The socio-economic impacts of wildfires for the society entail a decrease in market prices of goods and huge losses in environmental and social services provided by forests.

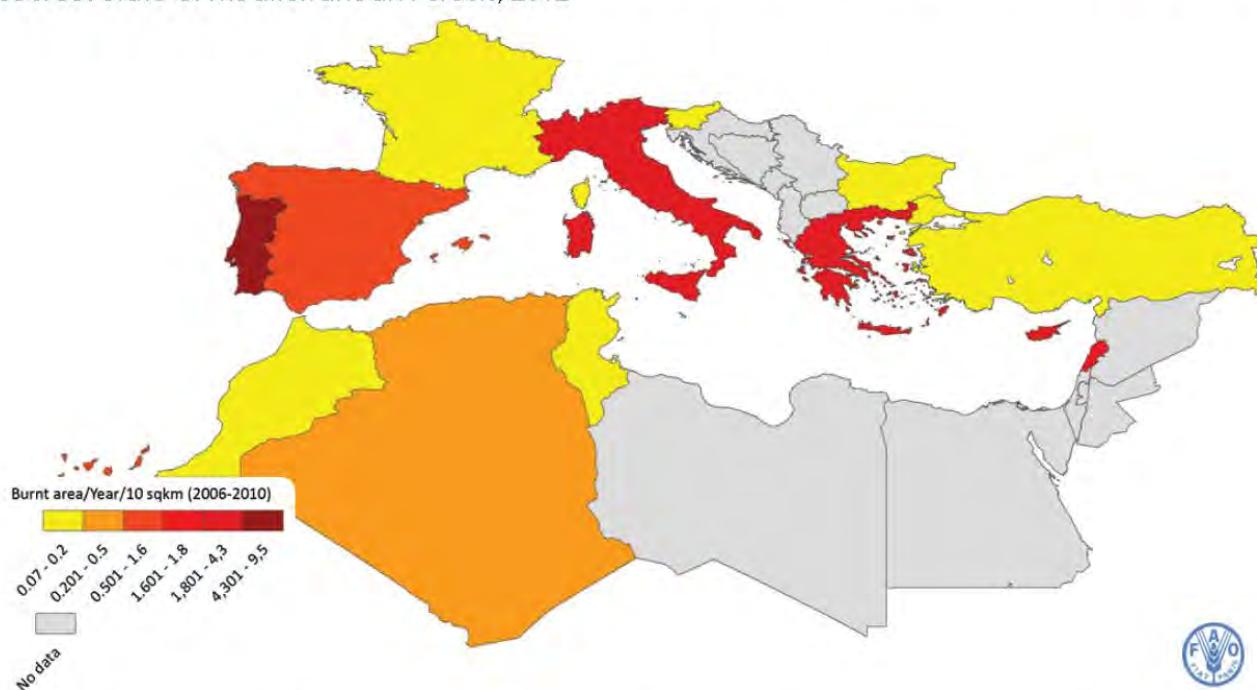
**Cost of wildfires: the case of Portugal.** In the National Forest Strategy published in Portugal in 2007, the average annual costs of wildfires for the previous 10 years, with 162 000 ha burned per year, was 378 million Euros, about one third of the value annually produced by Portuguese forests (including wood, cork and other non-wood products, the protective functions of forest). The estimated annual cost includes prevention and suppression of wildfire. In the National Forest strategy the minimization of wildfire risk is a priority for the conservation of Portuguese forests.



**Figure 8: Total burnt area for the period 2006-2010: 2 078 975 ha.** Source: State of Mediterranean Forests, 2012

As a consequence of climate change, an overall increase in burnt areas and a rise in the frequency, intensity and severity of wildfires are expected by next decades. The number of days per year of high fire risk is already increasing and new areas will be affected by wildfires. The risk of mega-fires, difficult to extinguish, will also rise in the Mediterranean. In northern Mediterranean countries, due to reforestation programs and agricultural decline, forests and other wooded lands are expanding increasing fire risks, while in southern Mediterranean countries, the pressure remains high, maintaining the fire risk at lower levels, with wood fuel collection, grazing and agricultural encroachment.

**Figure 9: Mediterranean total burnt area per year per 10 square kilometers of total national land area.** Source: State of Mediterranean Forests, 2012



This information on wildfires is reported at national level and, consequently, does not distinguish wildfires among different forest types. This lack of information on wildfires in Mediterranean forest type does not allow showing the exact burnt area in Mediterranean landscapes, even if the highest percentage of burnt area is concentrated in these ecosystems. For example, wildfires in the French Mediterranean region represented 69 % of the national total burnt area for the period 2000-2010.

### 3.4. New forest health threats in the Mediterranean

Outbreaks of forest insect pests damage some 35 million hectares of the world's forest annually (FAO, 2010). Out of this global figure, over five million hectares were reported from the Mediterranean region alone, which represent over 14% of the global damage and almost 6% of the total forest area of the region.

Climate change can affect forest pests and the damage they cause by: directly impacting their development, survival, reproduction and spread; altering host defences and susceptibility; and indirectly impacting the relationships between pests, their environment and other species such as natural enemies, competitors and mutualists.

A deeper understanding of the complex relationships between a changing climate, forests and forest pests is vital to enable those responsible for forest health protection and management to anticipate and prepare for changes in pest behaviors, outbreaks and invasions (FAO, 2008).

## 4. Forest governance in the Mediterranean: towards integrated national forest programmes and policies

Today, forest administrations and other stakeholders in the Mediterranean, particularly in southern and eastern countries, are aware of the different forms of overuse, competing land uses and climate change impacts, which negatively affect forest resources and other related sectors (agriculture, energy, tourism, water, etc.).

In northern Mediterranean countries, forest managers are under the pressure of high social demands for environmental services, without enough adapted policies, financing mechanisms and other instruments. In the whole region, most national development policies do not consider the forest sector as a priority.

Furthermore, closely related sectors which benefit directly from forest goods and services (e.g. agriculture, energy, tourism, mining and health) rarely recognize their value and/or contribute through investment for their sustainable management.

Most countries in the region have engaged in a National Forest Programme process to move towards sustainable forest management, improve forest governance and develop more cross-sectoral and participatory approaches for the development, implementation and evaluation of forest policies.

National Forest Programmes (NFP) are encouraging multi-stakeholders participatory approaches at both national and local levels, which are not widespread practices yet, but are progressing in many countries.

In the past ten years, most countries have paid greater attention and adopted specific policies to the issues of climate change, forest fires, forest health and vitality as well as the protective functions of forests, especially erosion control.

Until now, little attention has been given to most of Non-Wood Forest Products (NWFPs) except for well recognized products such as cork (Portugal and Spain) or pine nuts (Spain, Turkey, Lebanon, etc.).

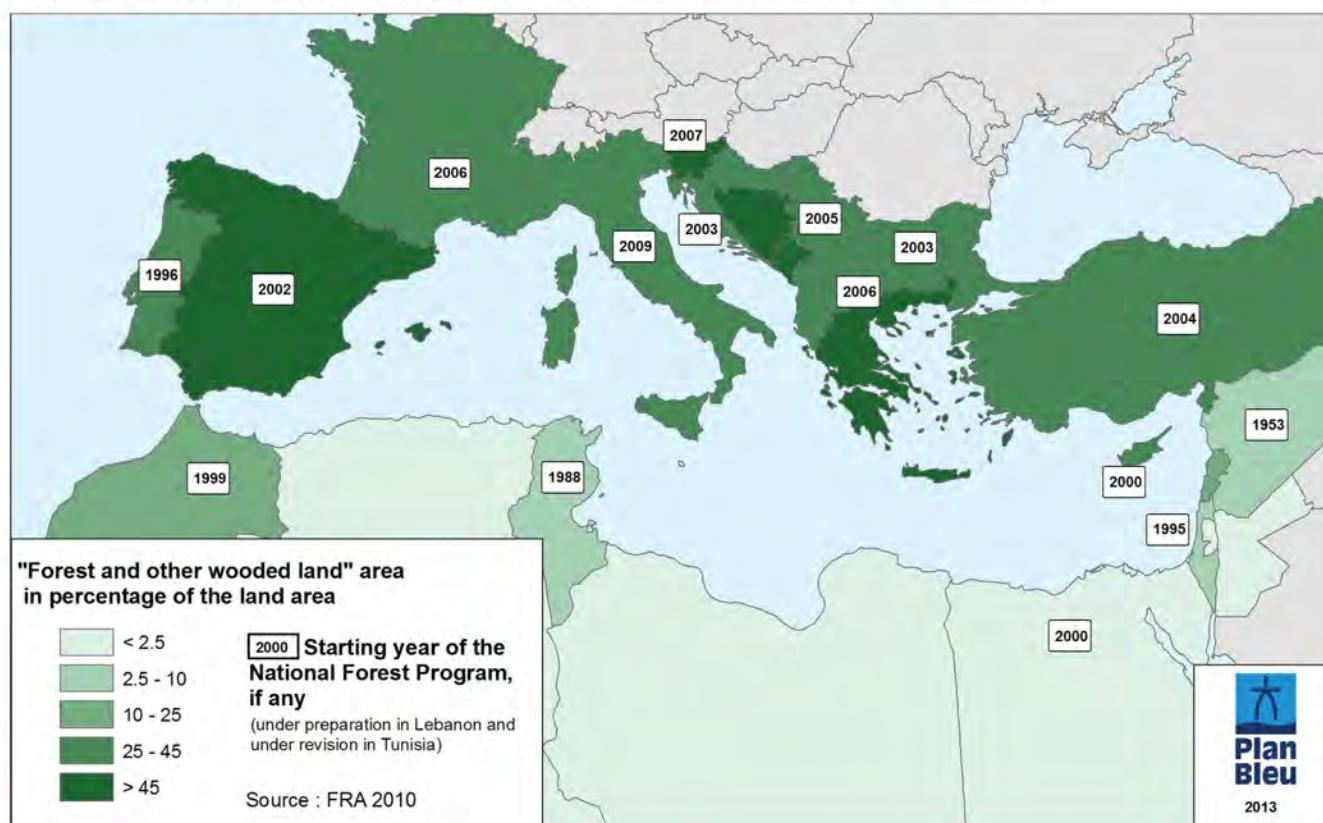
Although some countries have adopted policies to encourage sustainable management and use of NWFPs, there is still much to be done to recognize their value and take them into account in management decisions.



At the territorial level, local initiatives based on participatory and intersectoral approaches are multiplying and bringing progress in terms of governance, enabling to face the new challenges of sustainable forest management. Land tenure reform should also be addressed in several Mediterranean countries in order to improve the involvement of local stakeholders in sustainable management of forest ecosystems.

The need for a regional cooperation to face these Mediterranean forest issues led to the creation of the Collaborative Partnership on Mediterranean Forests in 2010, as well as to the organization of Mediterranean Forest Weeks every two years.

**Figure 10: National Forest Programmes in the Mediterranean.** Source: Plan Bleu



## 5. Policy orientations for the management of Mediterranean forests

National and regional forest policies should be revised, completed or adapted and implemented for Mediterranean forests to maintain their quality, to continue to provide the various ecological and socio-economic goods and services and to contribute to socio economic development, based on an integrated landscape planning. As forests provide essential contributions to rural and urban populations and economies, such policies should be closely coordinated with socio-economic development strategies.

Improving governance of policy development, implementation and monitoring appears crucial, and implies to work at landscape/territory level and to foster the participation of all stakeholders.

The most critical aspects in this process are the effective involvement of all stakeholders at territorial level (local governance including land tenure aspects) and the continued support of training, research, innovation and communication, along with a stronger collaboration between relevant economic sectors.

Renewed policy orientations for the management of Mediterranean forests are needed.

Three main objectives and encompassing 9 strategic lines are recommended as follow:

<b>Objectives</b>	<b>Strategic lines of Strategic Framework on Mediterranean Forests</b>
Developing and promoting forest goods and services	Improve sustainable production of goods and services by Mediterranean forests
	Enhance the role of Mediterranean forests in rural development
	Promote forest governance and land tenure reform at a landscape level
Promoting resilience under global changes	Promote wildfire prevention in the context of global changes
	Manage Forest Genetic Resources and biodiversity to enhance adaptation of Mediterranean forest to climate change
	Restore degraded Mediterranean forests landscapes
Enhancing capacities and mobilizing resources	Develop knowledge, training and communication on Mediterranean forests
	Reinforce international cooperation
	Adapt existing financing schemes and develop innovative mechanisms to support implementation of forest policies and programmes

The presented **Strategic Framework on Mediterranean Forests: policy orientations for integrated management of forest ecosystems in Mediterranean landscapes** should be implemented according to the characteristics and needs of each Mediterranean country.

