

17–21 mars  
march 2013

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## **SIDE EVENT ON THE III MFW**

### **State of Mediterranean Forests - SoMF**

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and Marion BRIENS (PLAN BLEU)

**COFO – SEPTEMBER 2012**

## **1. Mediterranean context: changes and prospects**

- 1.1 A socio-economic gap between the Northern and Southern rims of the Mediterranean
- 1.2 Growing pressures on the environment

## **2. State of forest resources in the Mediterranean region**

- 2.1 Assessment of changes in Mediterranean forest areas
- 2.2 Biotic and abiotic disturbances
  - 2.2.1 Forest fires: assessment and risk evaluation
  - 2.2.2 Insects and diseases
- 2.3 Economic value of Mediterranean forests
  - 2.3.1 Goods and services provided by Mediterranean forest ecosystems
    - 2.3.1.1 Mediterranean forests and water-related services
    - 2.3.1.2 Wood products in Mediterranean forests
    - 2.3.1.3 Mediterranean forests and Non-Wood Forest Products (NWFPs)
      - 2.3.1.3.1 Cork oak in Mediterranean forests
      - 2.3.1.3.2 Pinus pinea in Mediterranean forests
      - 2.3.1.3.3 Other NWFP
  - 2.3.2 Other goods and services provided by Mediterranean forests
- 2.4 Urban forests and peri-urban forests in the Mediterranean



## **3. Forest policies, institutions and legal frameworks**

## **4. Mediterranean forests and climate change**

- 4.1. Forest Genetic Resources (FGR): a key issue for adaptation of Mediterranean forest ecosystems
- 4.2. Forest fire prevention under new climatic conditions
- 4.3 Impacts of climate change on insects and diseases in Mediterranean forests
- 4.4. Adaptive management and restoration practices in Mediterranean forests
- 4.5 Climate change mitigation by forests and financing opportunities through the Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism



## 5. Some key forest management issues at landscape/territorial level

1. Spain (Valencia: planning of fire prevention activities at local level)
2. France (Maritime Alps: experimental forest management with low-density planting to increase resilience to climate change)
3. Italy (Vesuvio National Park: soil-bioengineering to control soil erosion)
4. Portugal (FSC Certification and Payment for Ecosystem Services in Cork Oak Woodlands)
5. Algeria (Tlemcen: impact of human activities on forest ecosystem)
6. Morocco (Ifrane: watershed management)
7. Turkey (Yalova: NWFP, tourism)



## Chapter 1. The Mediterranean Context

### **An ecological region** with

- Vulnerable ecosystems (water scarcity, fire risk)
- High anthropogenic pressures
- High sensitivity to climate change

### **Important concerns**

- Regional population doubled in 50 years and to peak in 2055
- 60% of the population of the world's countries in water stress



- Northern Mediterranean countries
- Non-EU Northern Mediterranean countries
- Southern and Eastern Mediterranean countries
- EU non Mediterranean countries



## Sharp differences between the rims

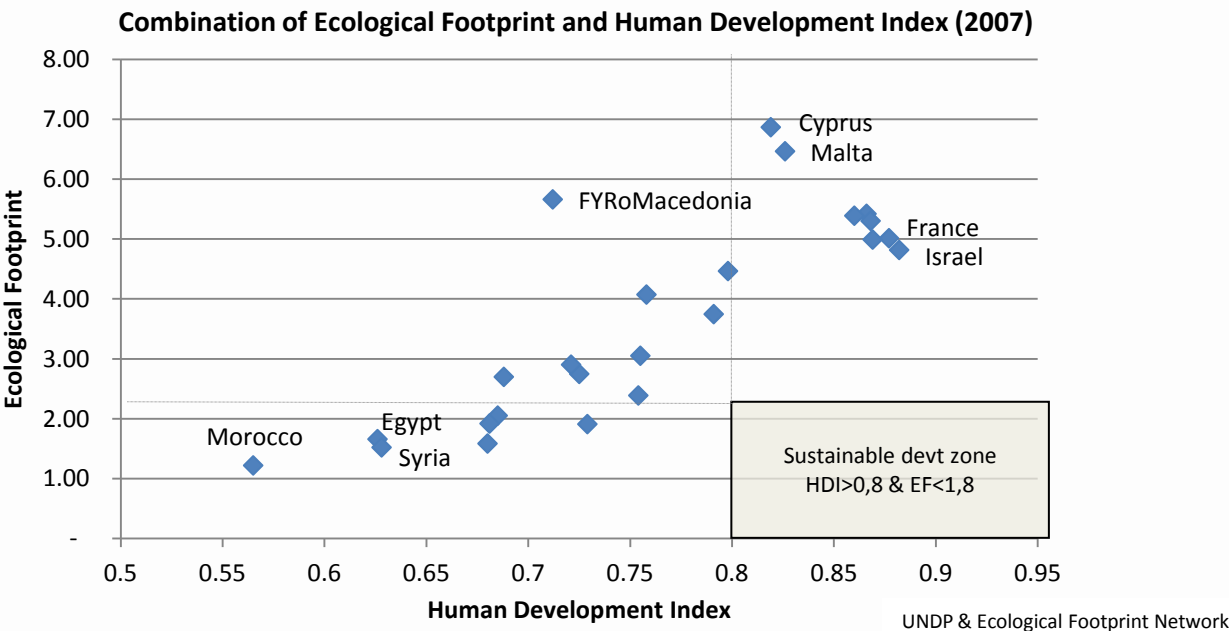
### Northern countries :

- Population stability and higher Human Development Indices
- Concentration of the regional economic wealth (80%) and water resources (73%)

### Southern and eastern countries :

- Higher poverty rates and rapid population growth
- Lower Ecological Footprints but lack of control over anthropogenic pressures

## No country in the “Sustainable Development Zone”



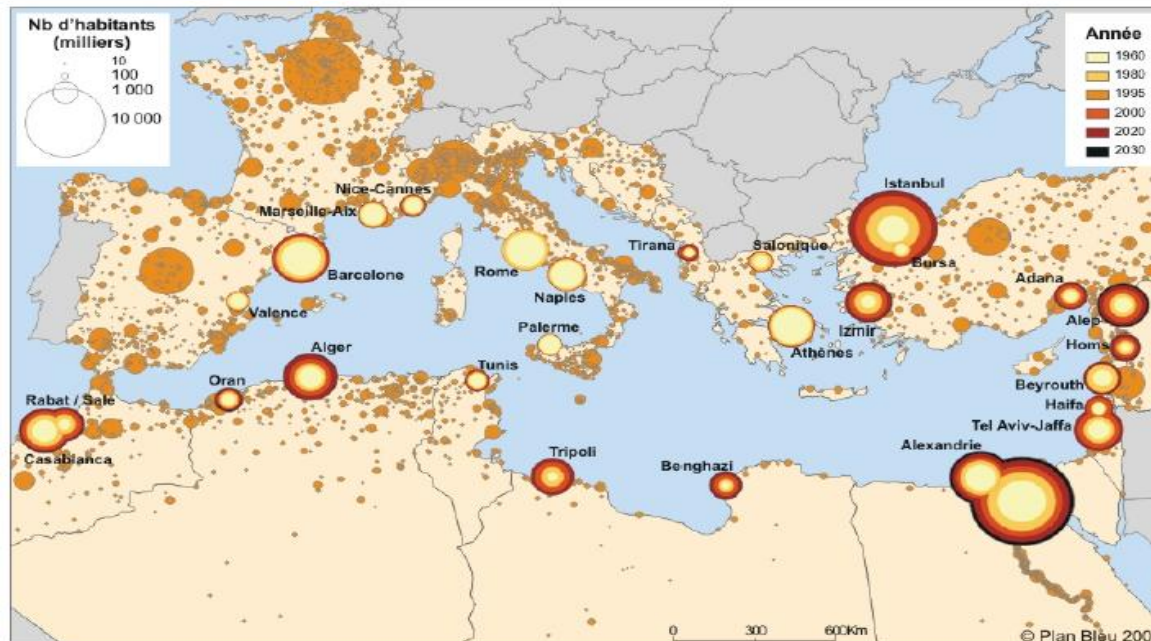
**Population to reach 625 million inhabitants in 2050 (507m in 2010)**

**Rapid growth** mostly:

- In the Southern and Eastern countries
- In urban/suburban areas
- In coastal areas

Although **demographic pressure** should start to **decrease after 2015 in rural areas**, the often unplanned **urban sprawl is intensifying threats on ecosystems** and biodiversity through habitat loss and fragmentation

Projected urban population by 2030



## Threats on biodiversity

- About **18%** of Mediterranean species are threatened with extinction
- **5** oak species endemic to the Mediterranean are threatened with extinction
- Protected areas are unequally distributed, more than **90%** are found in Northern countries

In the **Northern countries**: Forest expansion and high fire risk (agricultural decline)

In the **Southern countries**: Overexploitation of forest resources (grazing, woodfuel)

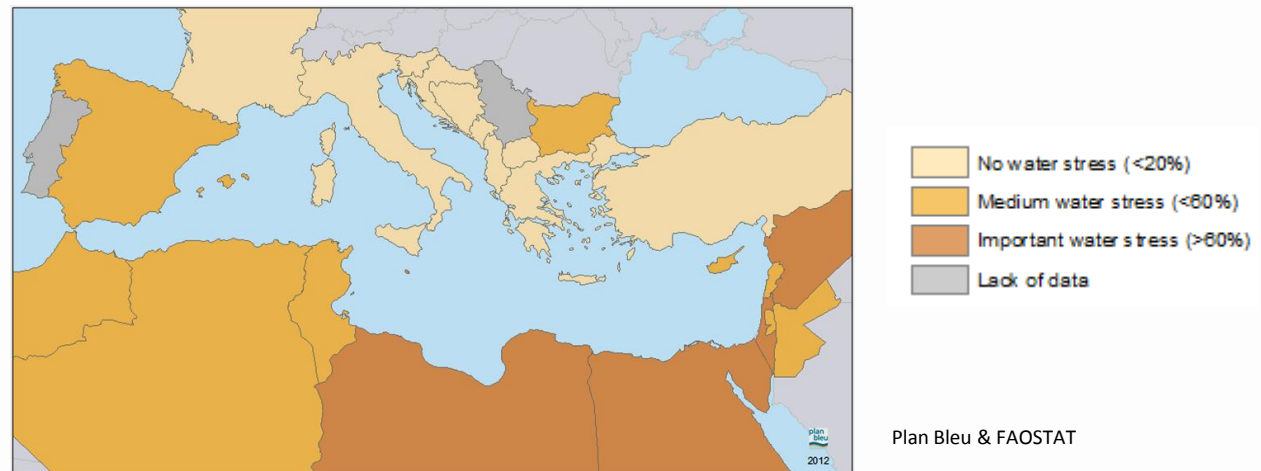
## Energy issues

**80%** of energy use from **fossil fuel**

Since 1999 : **+15% greenhouse gases emissions** mainly due to the Northern countries (63% of the emissions), but increasing rapidly in the Southern countries (+32%)

## Water Stress

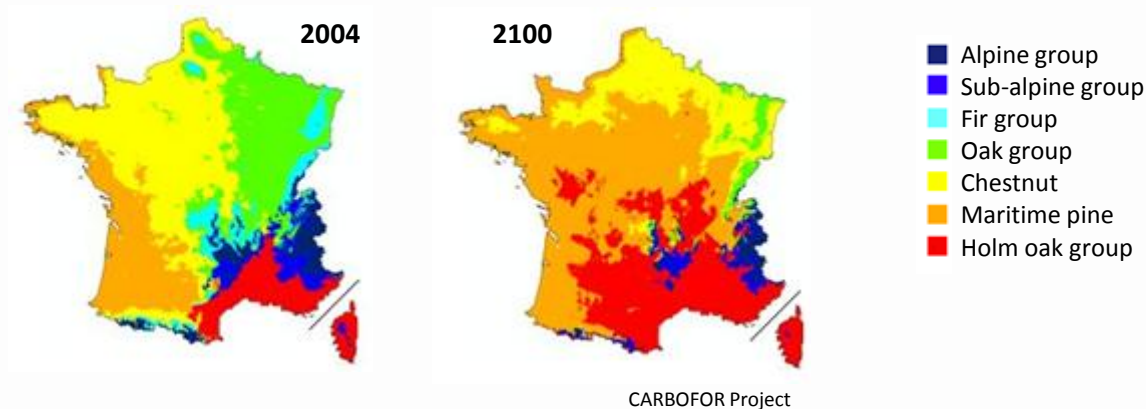
Renewable water resources exploitation index (%)

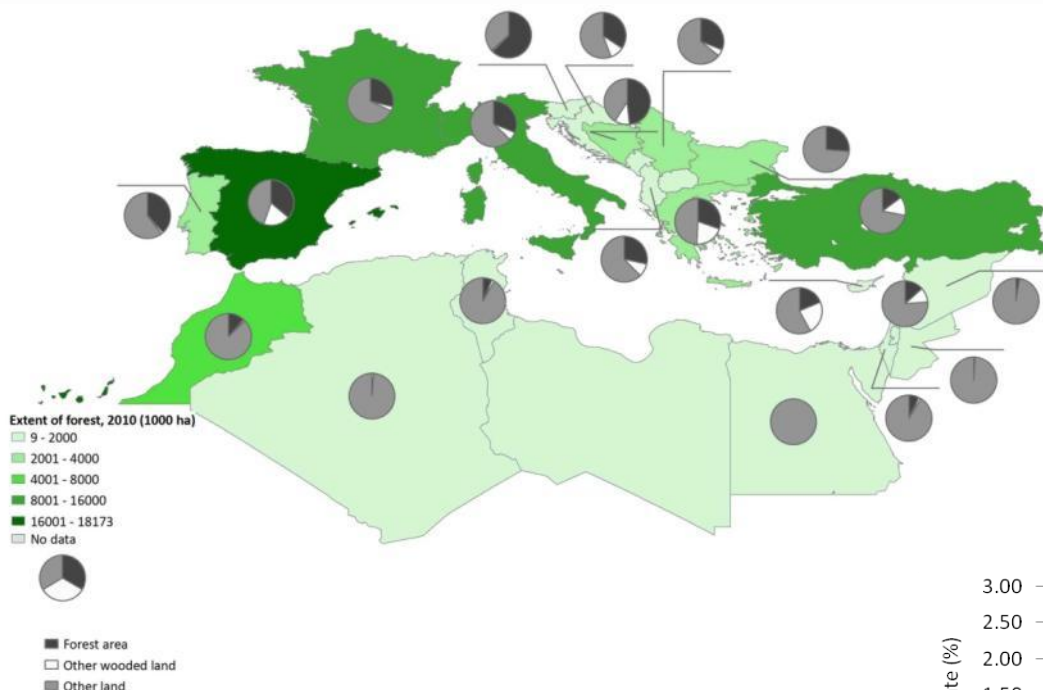




## Forecasted adverse effects of climate change (IPCC data 2007)

- **Temperature rise** and **less precipitation** causing:
  - Increased **fire** risk
  - Accelerated **desertification**
  - Increased **water stress** esp. in Southern countries
- Increased **frequency of extreme climate events** with:
  - Longer periods of **summer droughts**
  - Increased frequency of floods
- **Ecosystem shift & species extinction**



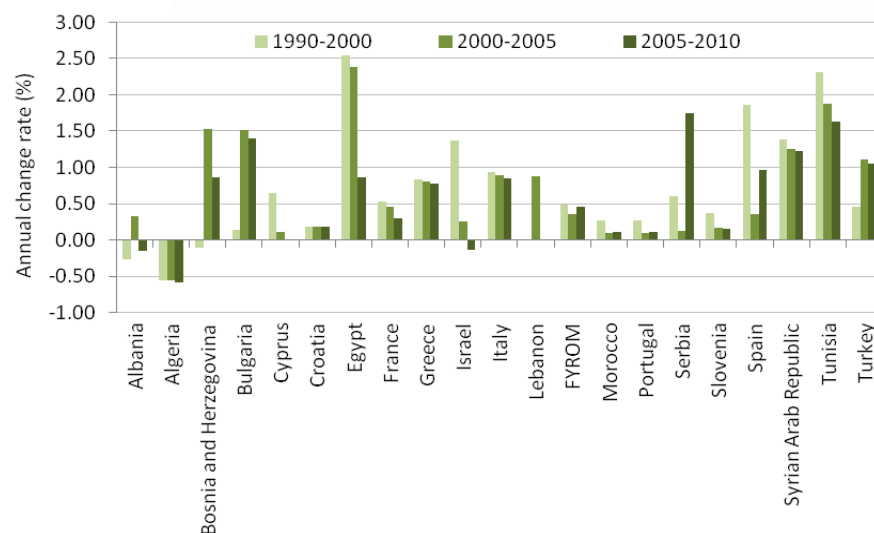


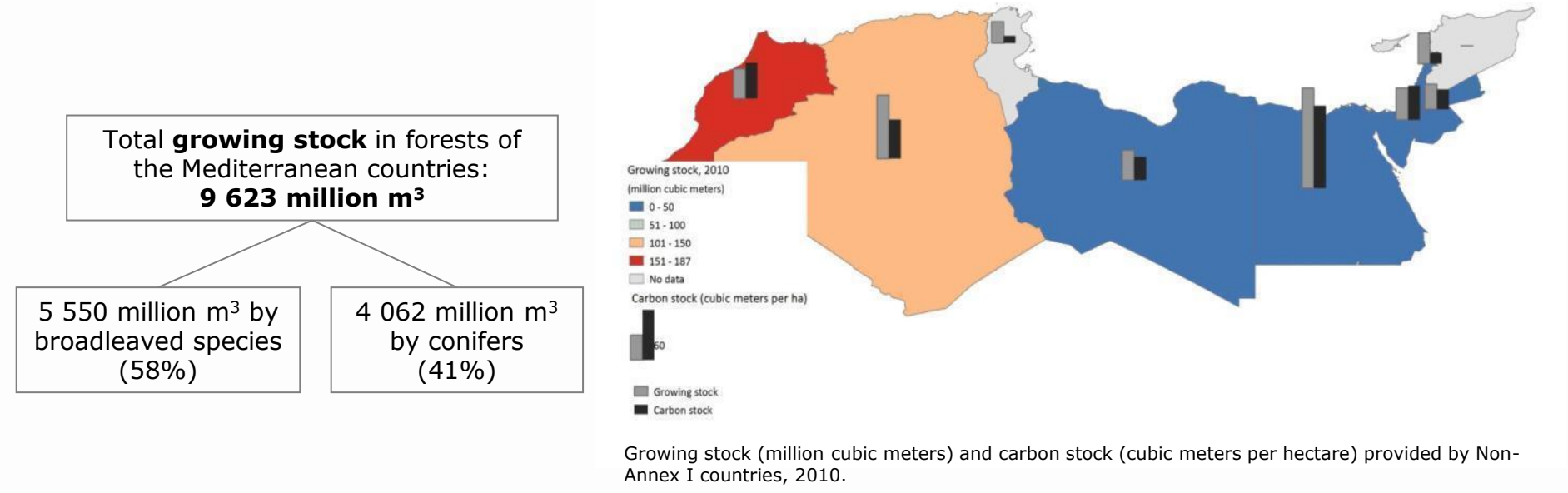
During the past 20 years **forest area in the Mediterranean countries has rose of almost 12 million ha.**  
On average it has increased of **0.68%/year percent per year**

- In **2010, forest area in the Mediterranean countries** amounts to more than **85 million ha** representing **2 % of the world forest area**

- Forest area is unequally distributed over the Mediterranean basin, with significant differences among countries: **more than 50 percent of forest area is concentrated in Spain, France and Turkey**

- **Other Wooded Lands (OWLs)** represent only **4 percent of the total Mediterranean land area**





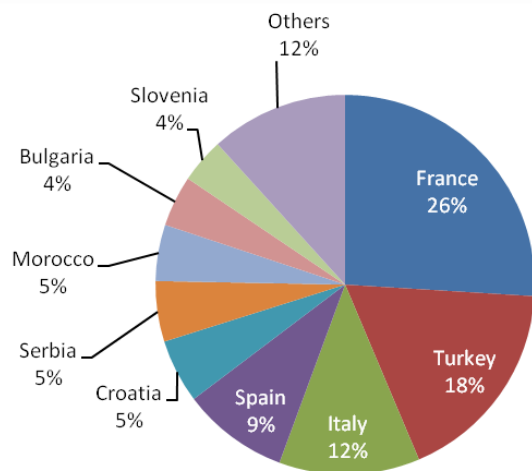
Country	Slovenia	Croatia	Bosnia and Herzegovina	Bulgaria	France	Serbia	Italy	Turkey	Montenegro	Egypt	Albania	FYROM	Algeria	Portugal	Cyprus	Spain	Greece	Israel	Lebanon	Libyan Arab Jamahiriya	Morocco	Jordan	Tunisia
Growing stock per hectare (m <sup>3</sup> )	332	213	164	167	162	153	151	135	133	120	97	77	76	54	51	50	47	38	37	36	36	30	26

Bulgaria, France, Italy, Spain and Turkey provided the highest volume of growing stock (more than 500 million m<sup>3</sup> per country)

**\*the stem volume of living trees**

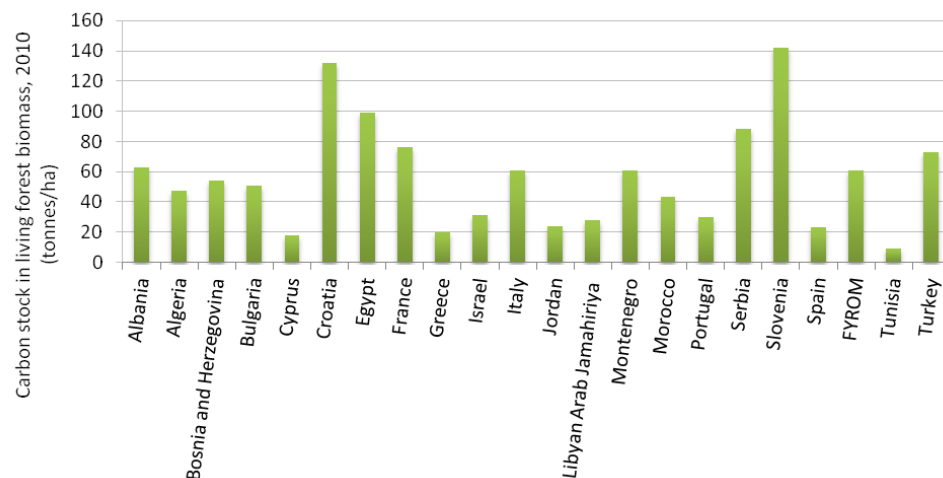
## Biomass

- In 2010, total biomass in the Mediterranean countries amounted to **more than 10 Gt, 95 % stocked in forests and only 5 percent in OWLs**
- During the period 1990-2010, the total **biomass stock increased by about 2 Gt** mainly due to the increase in forest area in the Mediterranean countries



Ten Mediterranean countries with the highest carbon stock in 2010

## Carbon stock



- In 2010 forests in the **Mediterranean countries stocked almost 5 Gt of carbon**, 1.6 % of world's forest carbon stock (289 Gt, FRA 2010)

- In the last 20 years carbon stock increased of about 1.2 Mt with a **rate of increase of about 1.3 % per year**.

- In contrast with the global decrease that characterized the world carbon stock, the Mediterranean countries present higher values in 2010 than 1990.

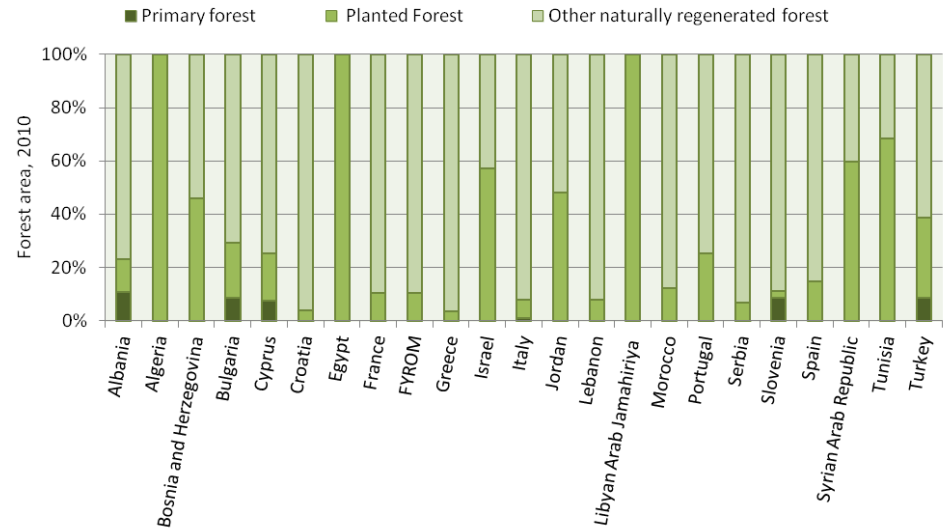
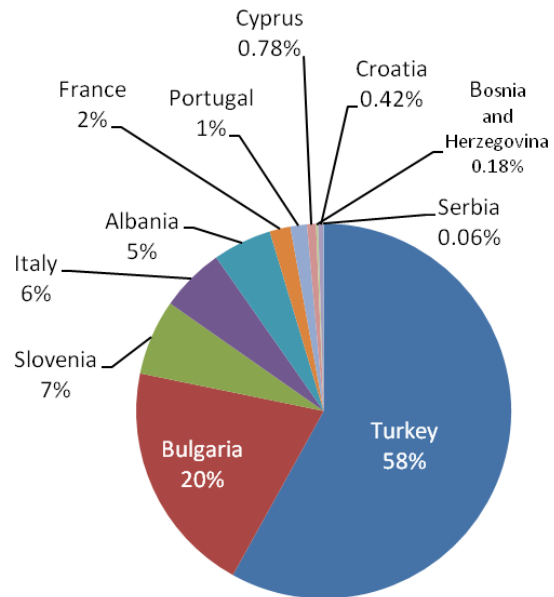


# Chapter 2. State of forest resources in the Mediterranean region: forest biological diversity

- **14 million ha** of forests in the Mediterranean countries are **planted forests**

- nearly 60% are distributed among Turkey, Spain and France.

At country level, planted forests represent the entire forest area in Egypt, Libyan Arab Jamahiriya, Malta and more than 50 percent of forest area in Israel, Syrian Arab Republic and Tunisia



- almost **1.67 million ha** are represented by **primary forests**, 2% of total forest area in the Mediterranean countries

- almost **8.5 million ha** of forests are **designated for conservation of biological diversity**, representing 10% of total forest area in the Mediterranean countries

Ten Mediterranean countries with the largest primary forest area, 2010.



## Chapter 2. State of forest resources in the Mediterranean region: assessment of Mediterranean forests in the Mediterranean countries

Based on **European forest types** an **estimation** of the **extent of Mediterranean forests** has been realized.

It has been assumed that the percentage of Mediterranean forest in North African countries is almost 100%.



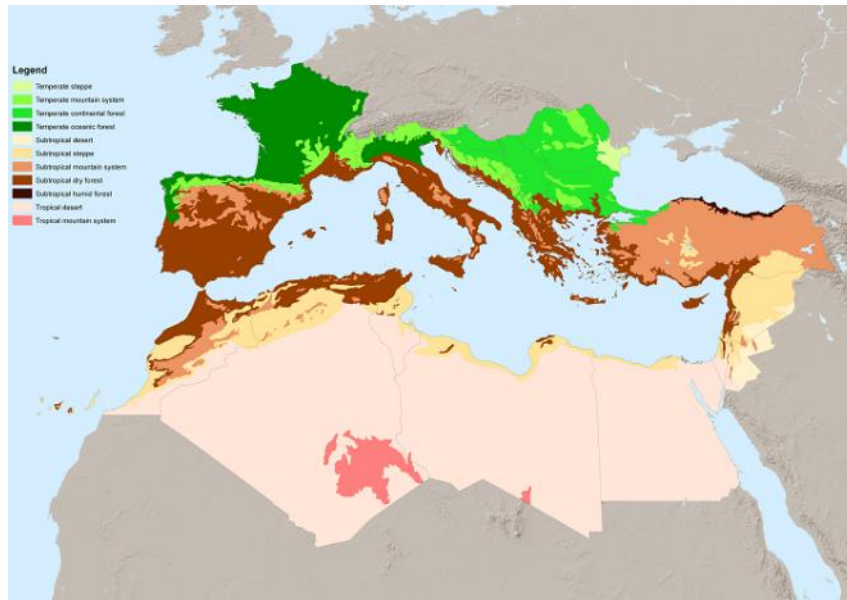
### Definition of Mediterranean forests:

Typical Mediterranean forests are composed of broadleaves (mainly oaks) both evergreen and deciduous. *Quercus ilex*, *Q. suber*, *Q. coccifera*, *Q. pubescens*, *Q. cerris*, *Q. pyrenaica*, *Q. toza*, *Q. calliprinos*, *Q. ithaburensis* and others, or conifers as *Pinus halepensis*, *P. brutia*, *P. pinea*, *P. pinaster* and *Juniperus* sp. are typical species of Mediterranean forests. The degradation of these forests has produced a low density, woody vegetation as the 'macchia' and the 'garrigue'. Where no water limitation occurs (e.g. along the rivers), forests of *Quercus robur*, *Q. petraea*, *Fraxinus* spp., *Populus alba* and *P. nigra* can prosper. Typical of the Iberian Peninsula, the arboreal vegetation named 'dehesa' is characterized by pastures with scattered oaks both evergreen and deciduous, sometimes mixed with stone pine. In the Xerothermo-Mediterranean zone mainly shrubs communities can be found. At higher elevation, forests partly made also with tree species that occur in other parts of the Europe can be found: *Castanea sativa*, *Fagus sylvatica*, *Pinus laricio*, *P. leucodermis*, *P. sylvestris*, *Abies alba* and Mediterranean firs and *Cedrus* sp. Non-endemic species introduced over the course of the centuries are included in these forests.



## Chapter 2. State of forest resources in the Mediterranean region: assessment of Mediterranean forests in the Mediterranean countries

- Based on 2011 FAO world's forests map, **a map of Mediterranean forests was realized**



The FAO Global Ecological Zones in the Mediterranean (derived from Iremonger and Gerrand, 2011)

Mediterranean ecological zones have been selected:

- subtropical dry forest
- subtropical steppe
- subtropical mountain system



Systematic distribution of Landsat imagery samples in the Mediterranean. The blue area represents the Mediterranean ecological zones



# Mediterranean forests



**Brown color** represents **non-Mediterranean forests** whereas different levels of **green** show the **percentage of cover in the Mediterranean forests**.

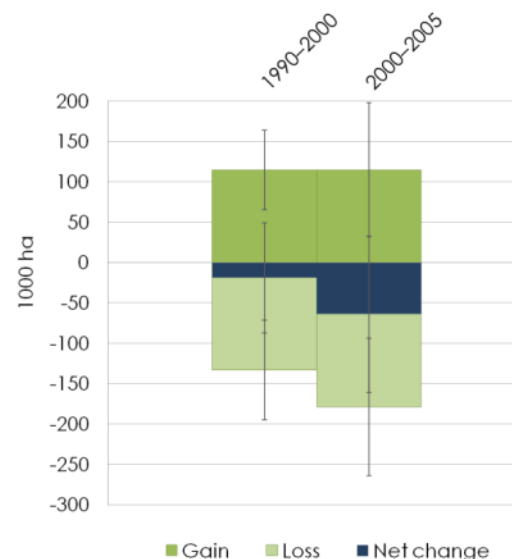
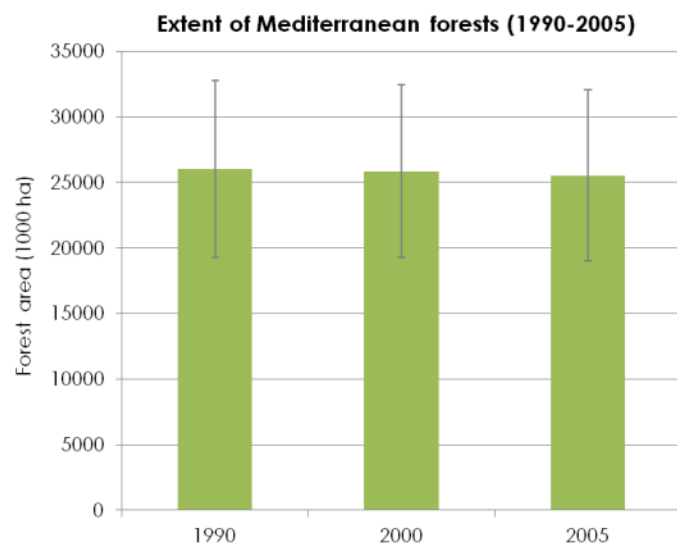
Areas with less than 10% of forest cover (other wooded land) are represented in beige.



## Chapter 2. State of forest resources in the Mediterranean region: assessment of Mediterranean forests in the Mediterranean countries

Based on the global remote sensing survey carried out to complement the country reporting process as part of the FAO Global Forest Resources Assessments, an estimation of changes in the Mediterranean forests was also obtained for the period 1990-2010.

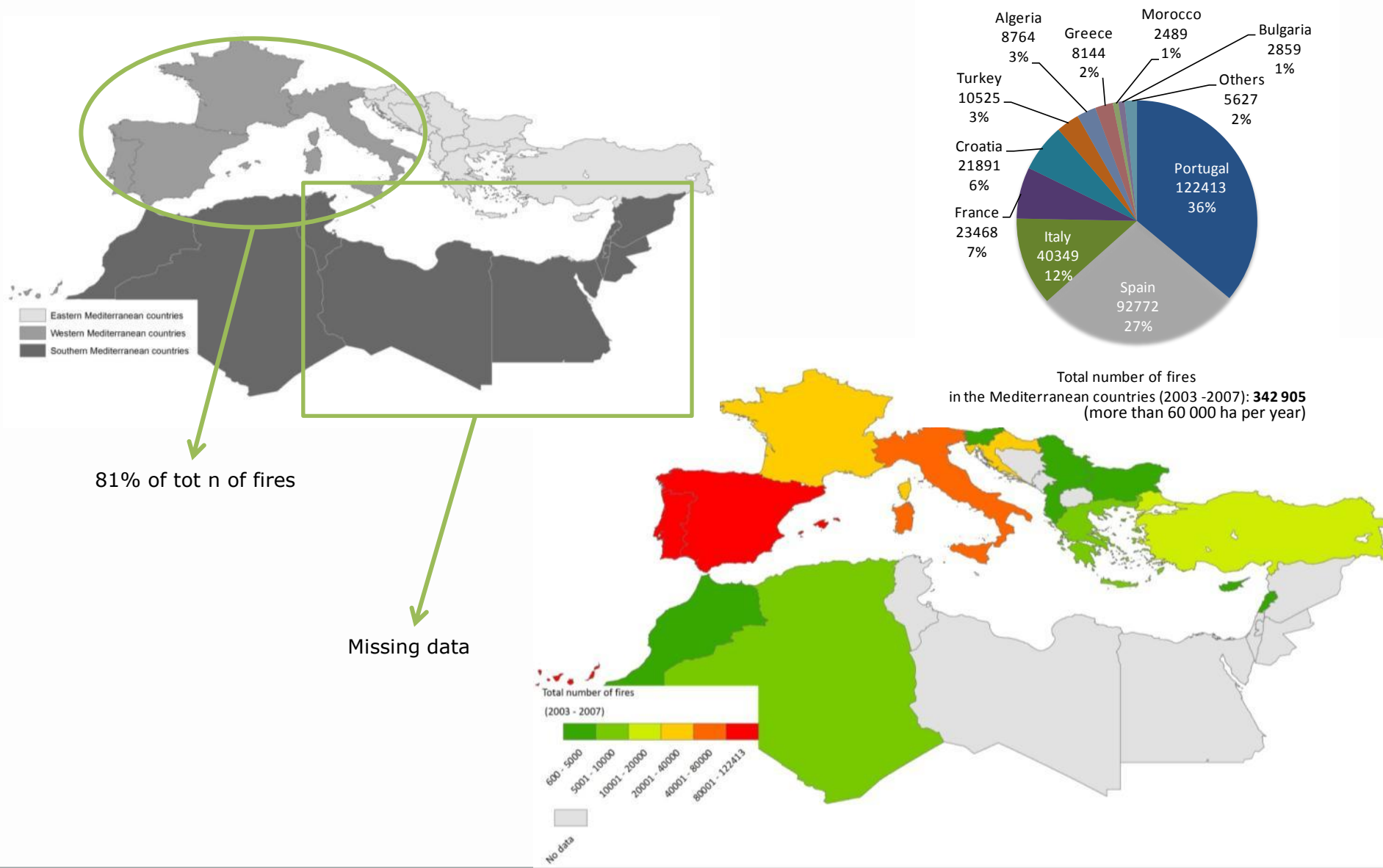
**In 2005 the extent of the Mediterranean forests was about 25.5 million ha, 32% of forest area of Mediterranean countries and 0.6% of world forests.**



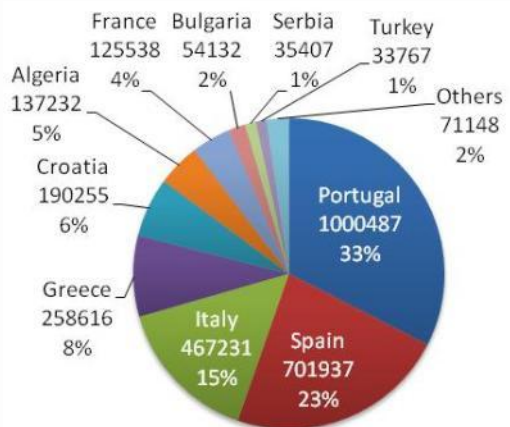
- Any significant changes in terms of total Mediterranean forest area between 1990 and 2005.
- However considerable both gain and loss could be detected: even if completely balanced, the dynamic character of forest ecosystems in the Mediterranean was highlighted.



Chapter 2. State of forest resources in the Mediterranean region: **fires**

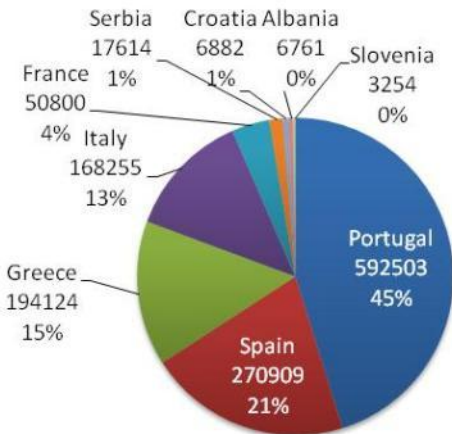


Chapter 2. State of forest resources in the Mediterranean region: fires



Total burnt area in the Mediterranean countries (2003 -2007):  
3 117 418 ha

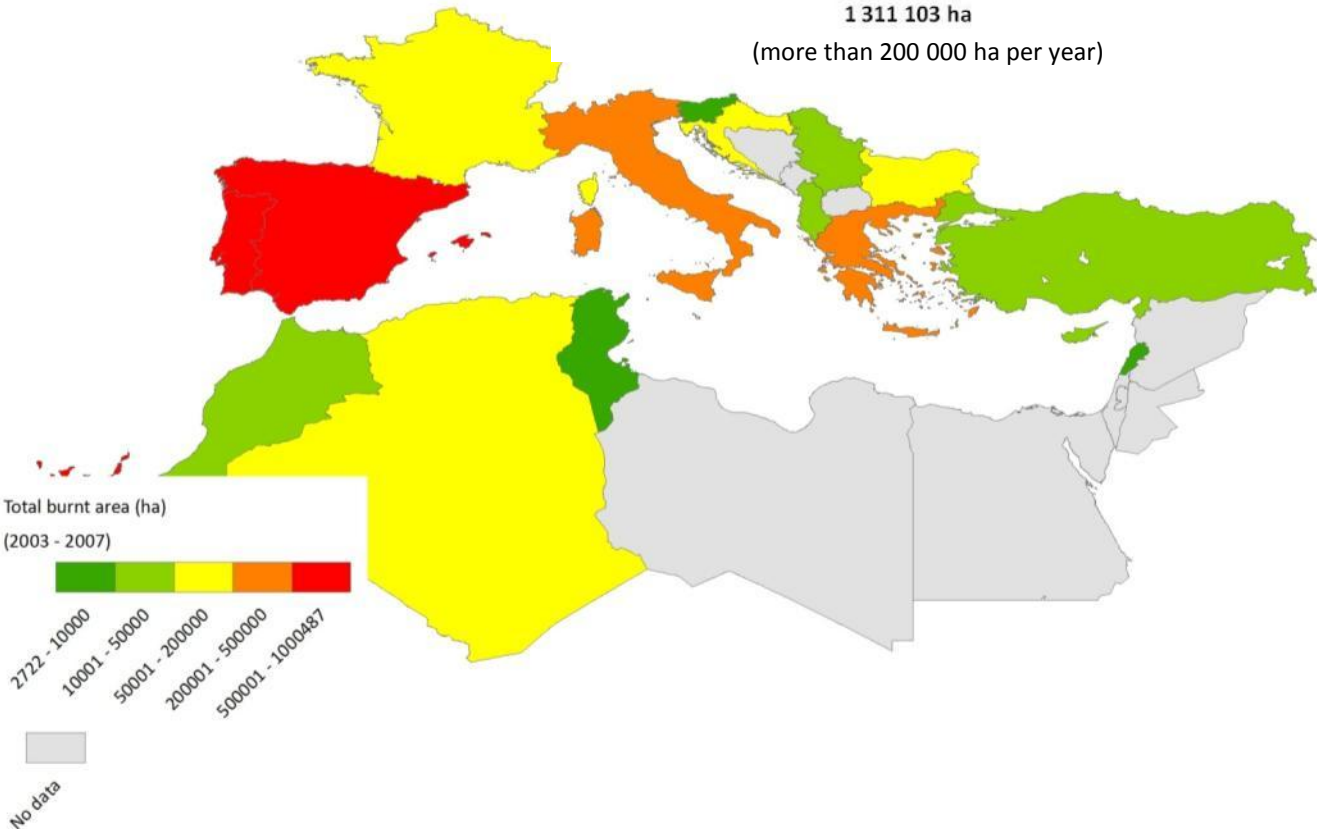
(about 600 000 ha per year)

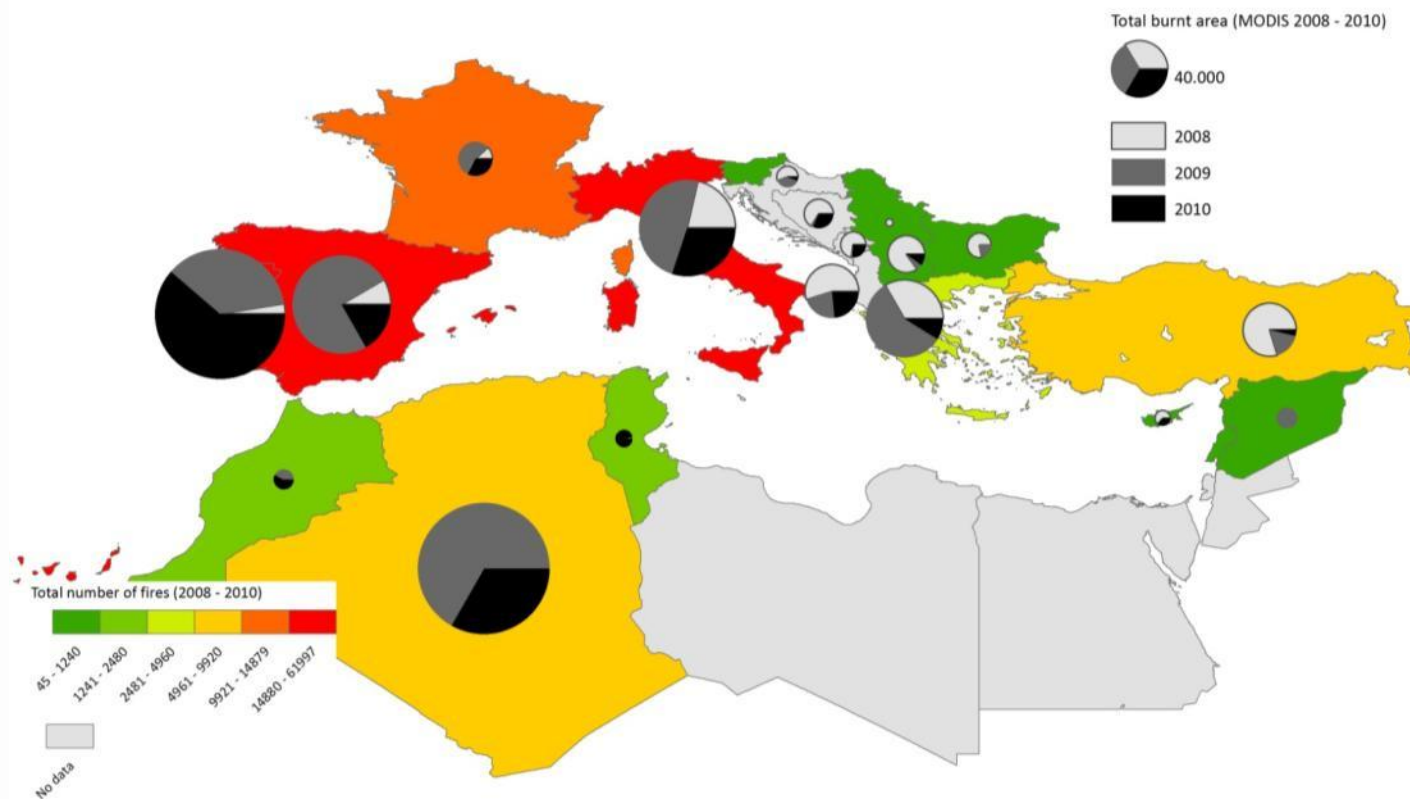


Total burnt forest area in the Mediterranean countries (2003 -2007):  
1 311 103 ha

(more than 200 000 ha per year)

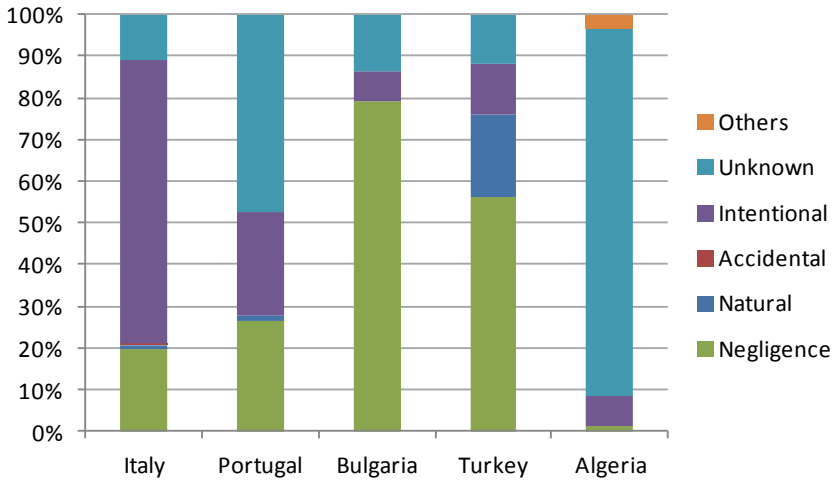
- **79%** of the total burnt area on the period 2003-2007 is burned in only four countries (**Greece, Italy, Portugal and Spain**)
- **Portugal and Spain** represent more than **50%** of the total burnt area on this same period 2003-2007



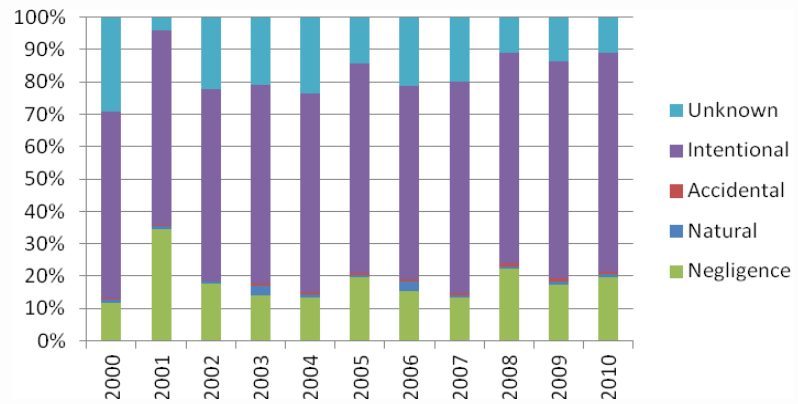


- Since 2008, MODIS satellite images allow mapping of fires of at least 40 ha
- in 2008-2010, **881 178 ha burned by fires of more than 40 ha**
- Algeria, Morocco and Tunisia have been recently involved by EFFIS/JRC (European Forest Fire Information System) in fire monitoring based on MODIS technology





Statistics on the causes of fires are far from complete but the available information show a prevalence of human-induced fires

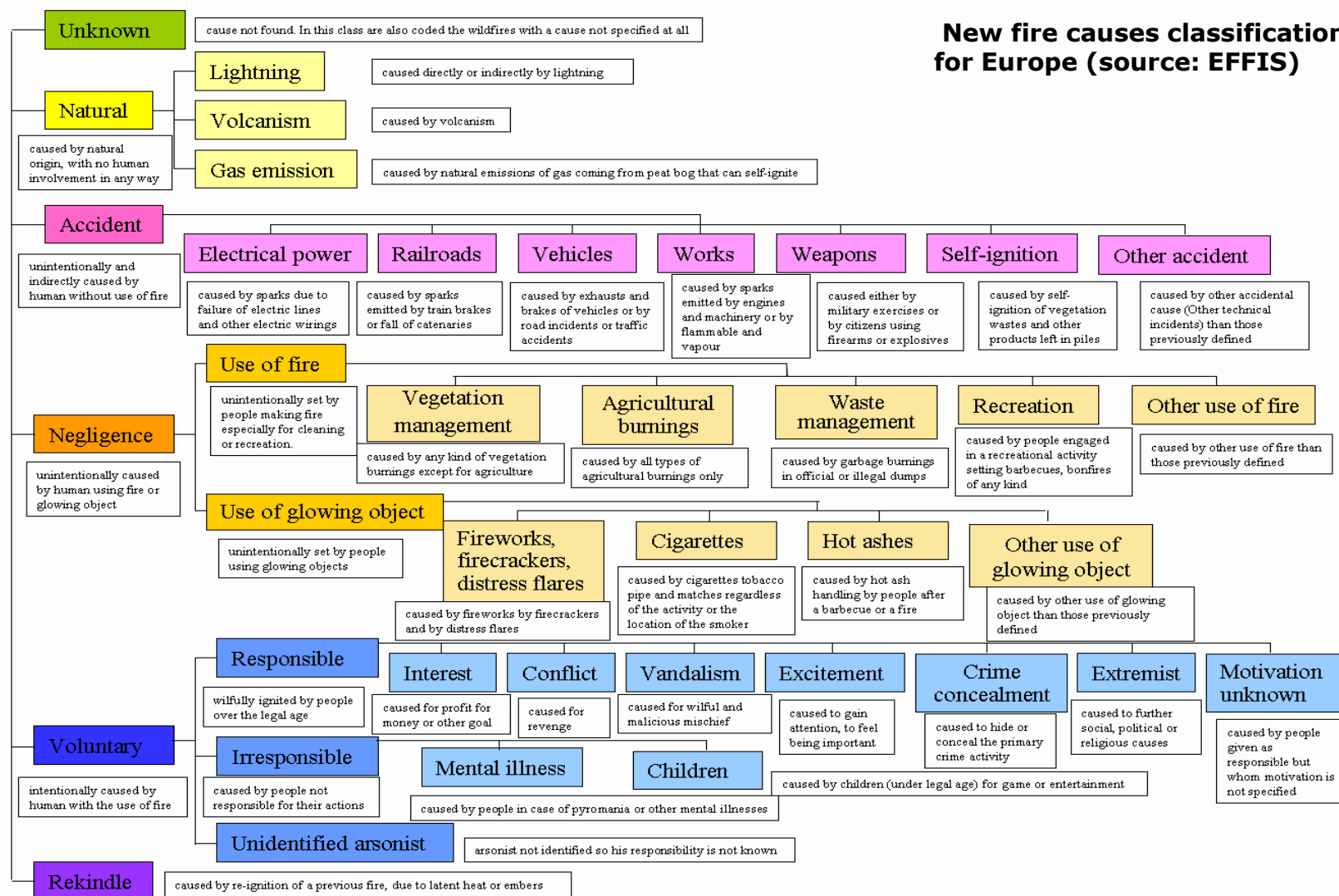


In Italy, intentional fires represent 68% in 2010.

The Italian *Corpo Forestale dello Stato* has currently developed a method of investigation of fire causes. This procedure detects fire causes on the fire scene or derives them from analyses and investigation. Once the cause of the fire is known, the investigation allows finding why the fire was generated, the reasons in case of unintentional fires or the motivations in case of intentional fires.



## New fire causes classification scheme for Europe (source: EFFIS)





# Chapter 2: State of forest resources in the Mediterranean region: insects, diseases and other disturbances



Total forest area affected by disturbances in Mediterranean countries, 2005

- Outbreaks of forest insect pests damage some 35 million hectares of the world's forest annually
- Of this global total, over **5 million hectares** damaged in the Mediterranean countries alone, **over 14% of the global damage** and **almost 6% of the total forest area of the region**

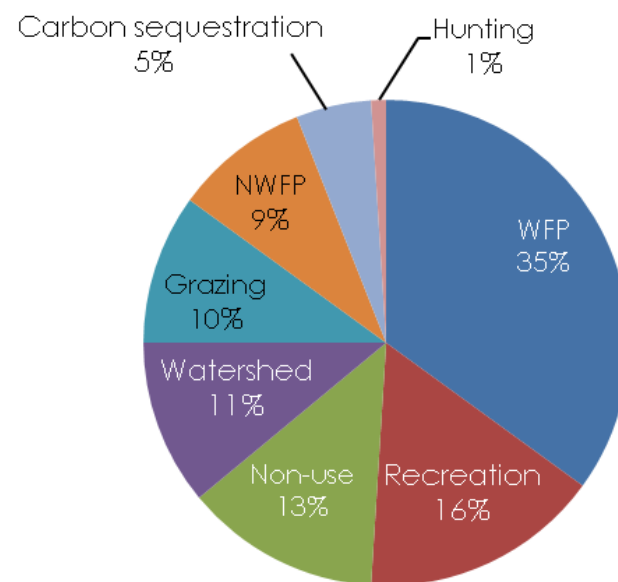
Country	Area of forest affected 1 000 ha			
	Insects	Disease	Other biotic	Abiotic
Albania	1	1	101	0
Algeria	217	-	-	-
Bulgaria	82	32	1	7
Croatia	27	10	8	19
Cyprus	6	0	4	0
Egypt	1	0	0	0
France	-	-	-	0
Israel	3	0	0	0
Italy	347	591	323	584
Lebanon	1	1	0	2
Morocco	33	-	16	-
Portugal	604	143	44	51
Serbia	118	-	-	-
Slovenia	1	0	0	1
Syrian Arab Republic	1	-	-	-
The former Yugoslav Republic of Macedonia	44	3	-	-
Tunisia	10	0	0	0
Turkey	172	12	-	11
<b>TOTAL</b>	<b>1668</b>	<b>794</b>	<b>498</b>	<b>675</b>



## Chapter 2. State of forest resources in the Mediterranean region: economic value of Mediterranean forests

Mediterranean forests are globally recognized for the extraordinary variety of goods and services they provide:

- landscape quality
- soil conservation
- watershed protection
- erosion and desertification control
- carbon sequestration
- biodiversity protection
- recreation resources



Composition of the Total Economic Value of Mediterranean Forests (source: Merlo & Croitu, 2005). NWFP: non-wood forest products, WFP: wood forest products, non-use: bequest and existence value.



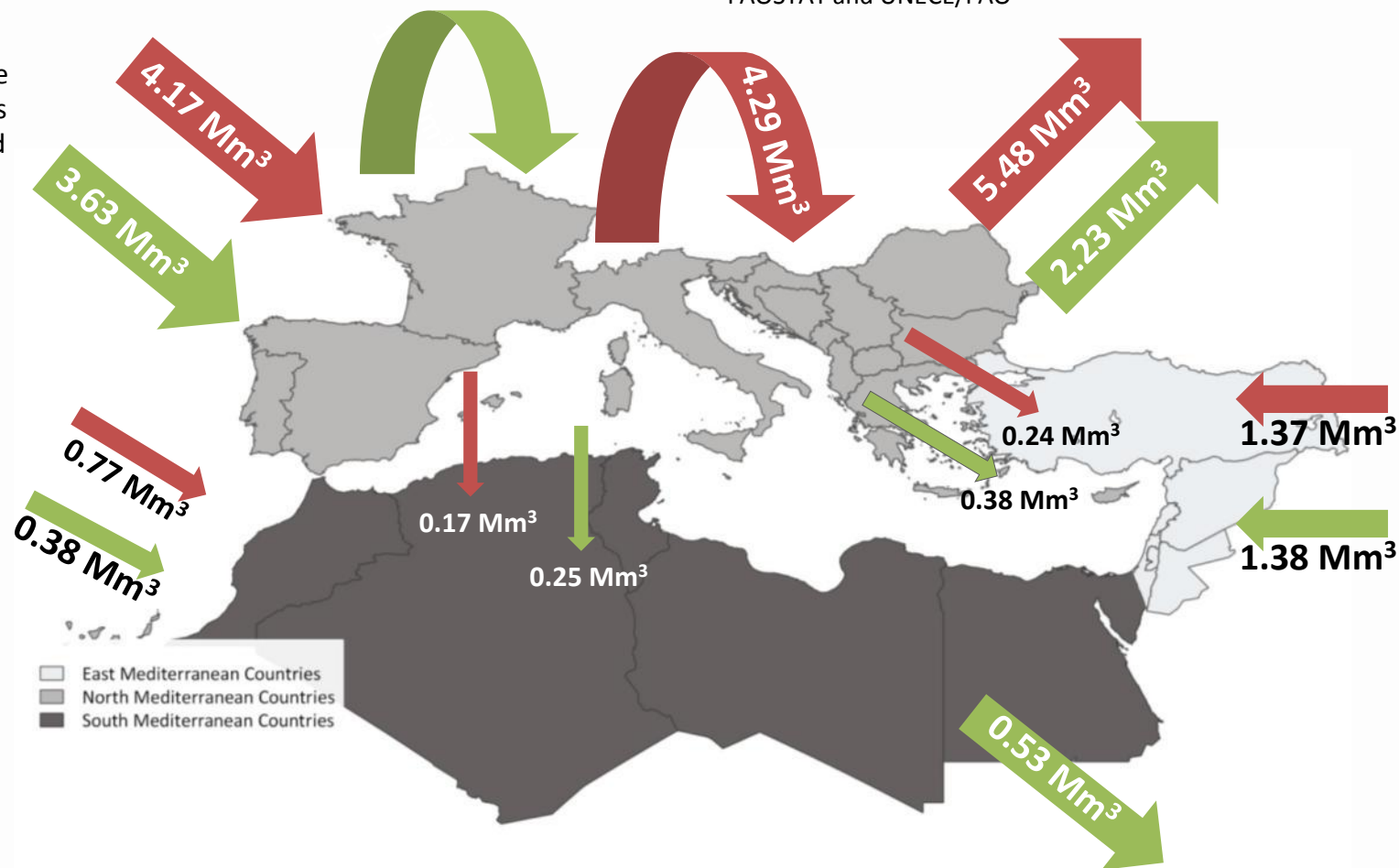


## Chapter 2. State of forest resources in the Mediterranean region: wood and wood products

- The production of **wood** and **wood products** from countries in the Mediterranean region is far from being negligible.

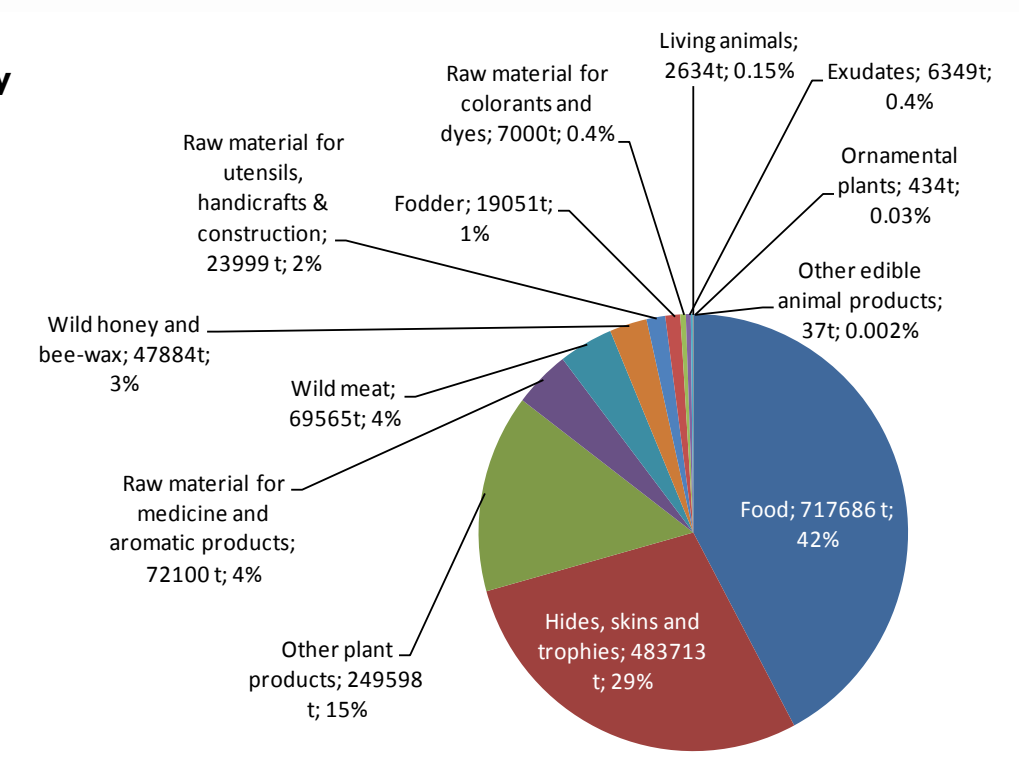
- It is not enough to meet the needs of the region, which remains importer of wood and wood products

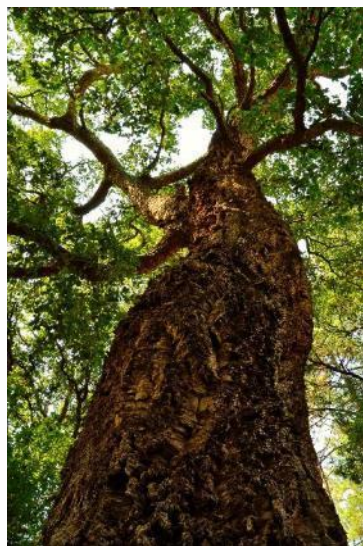
Representation of flows of **round wood (in red)** and **wood-based panels (in green)** in the Mediterranean region and with other regions of the world (over 100 000 m<sup>3</sup>, in millions m<sup>3</sup>) – source FAOSTAT and UNECE/FAO



Chapter 2. State of forest resources in the Mediterranean region:  
Non-wood forest products (NWFPs)

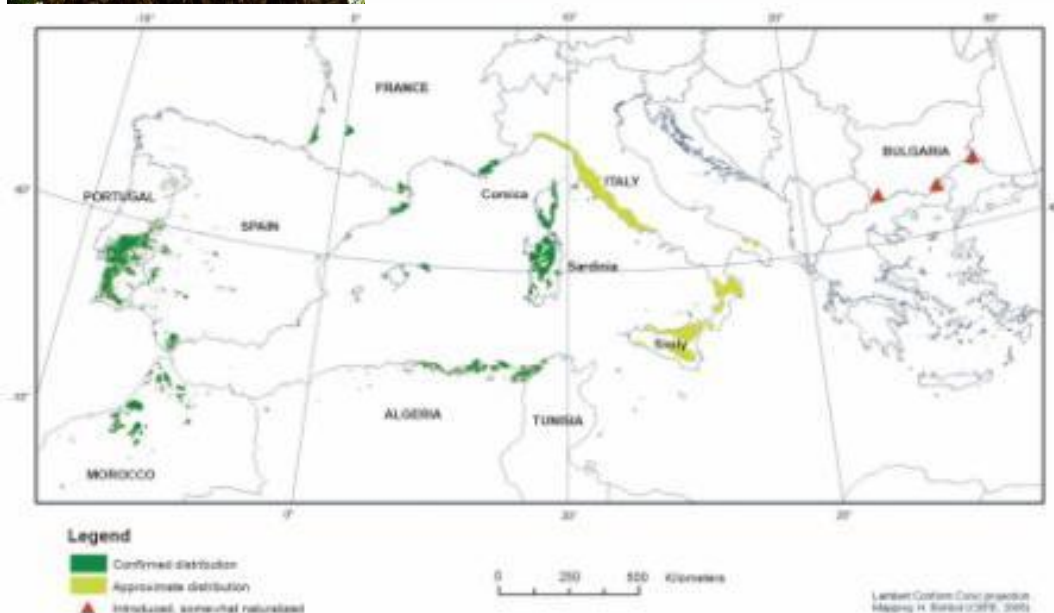
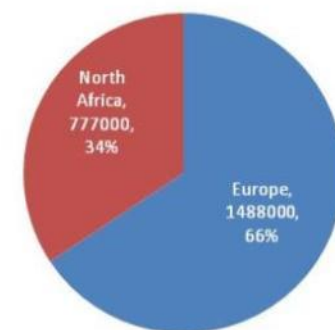
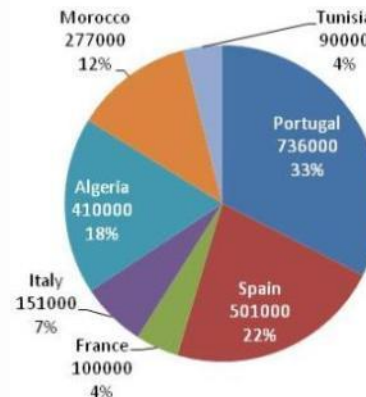
Mediterranean forests are surely distinguished by the **wood products for timber** and energy but mainly for the **unique non-wood products they provide**





• Extending over a surface of about **2.5 million hectares** in the world, is located almost entirely in the Mediterranean countries:

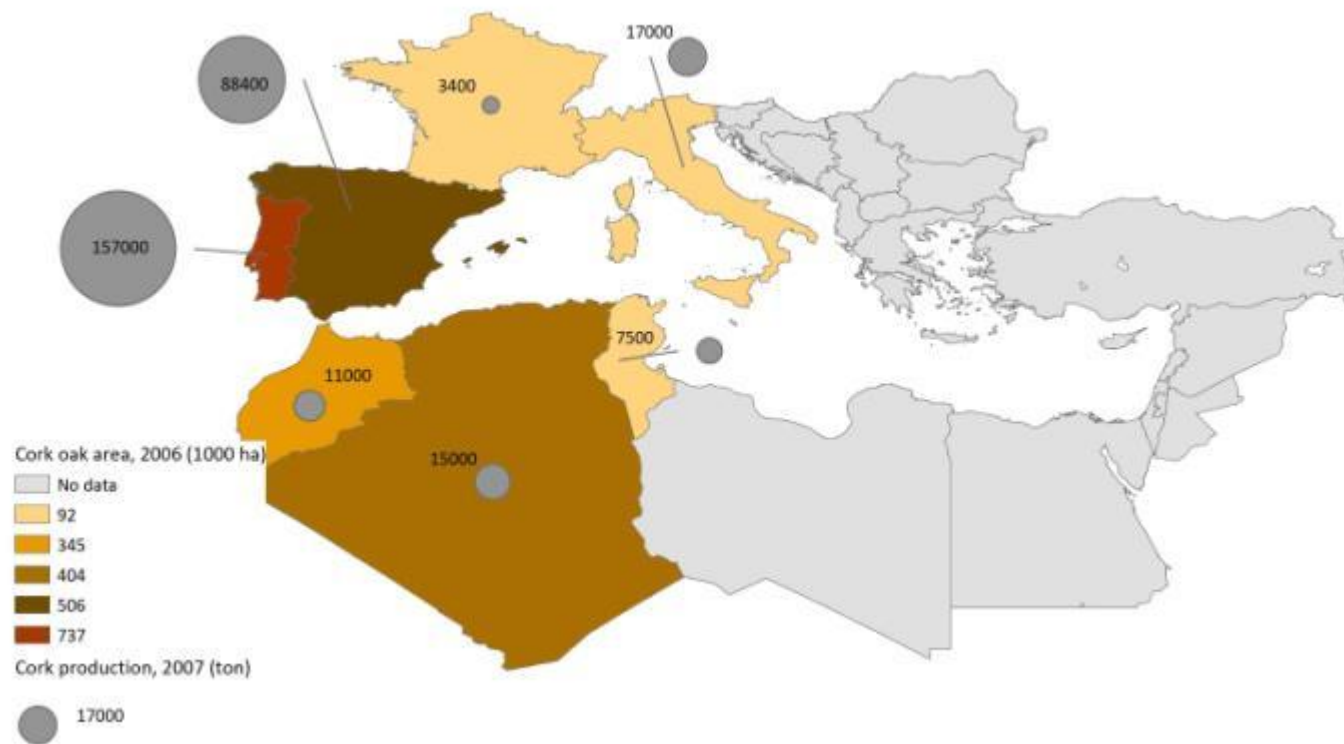
- **Algeria**
- **France**
- **Italy**
- **Morocco**
- **Portugal**
- **Spain**
- **Tunisia**



Total area adds up almost **1.5 million hectares in Europe** and almost **1 million hectares in North Africa**

Distribution map of cork oak in the Mediterranean basin (source: Cork Oak Woodlands on the Edge, edited by James Aronson, Joao S. Pereira, and Juli G. Pausas, figure 1.1, page 14)



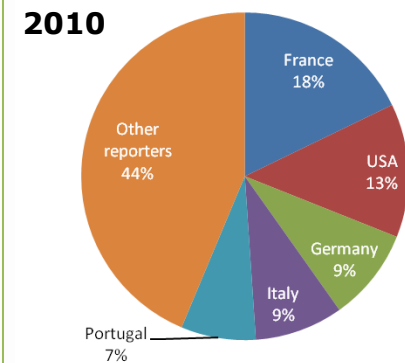


**Portugal** is the main producer of cork, followed by Spain, Italy, Algeria, Morocco, Tunisia and France.

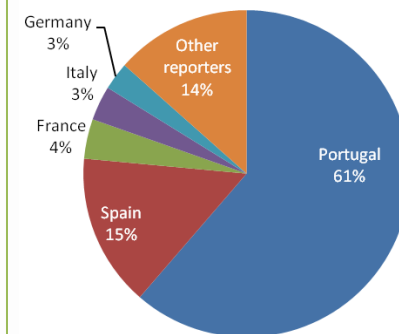
**Portugal exploits 85%** of its cork oak forest stands and **produces more than 50% of the total** production.

In **North Africa**, **42% of the cork oak forest** landscape is **unexploited**.

Despite that **Algeria, Morocco and Tunisia** produce and export **11% of the total production**



Total Import: 1 701 282 360 USD



Total Export: 1 630 563 865 USD



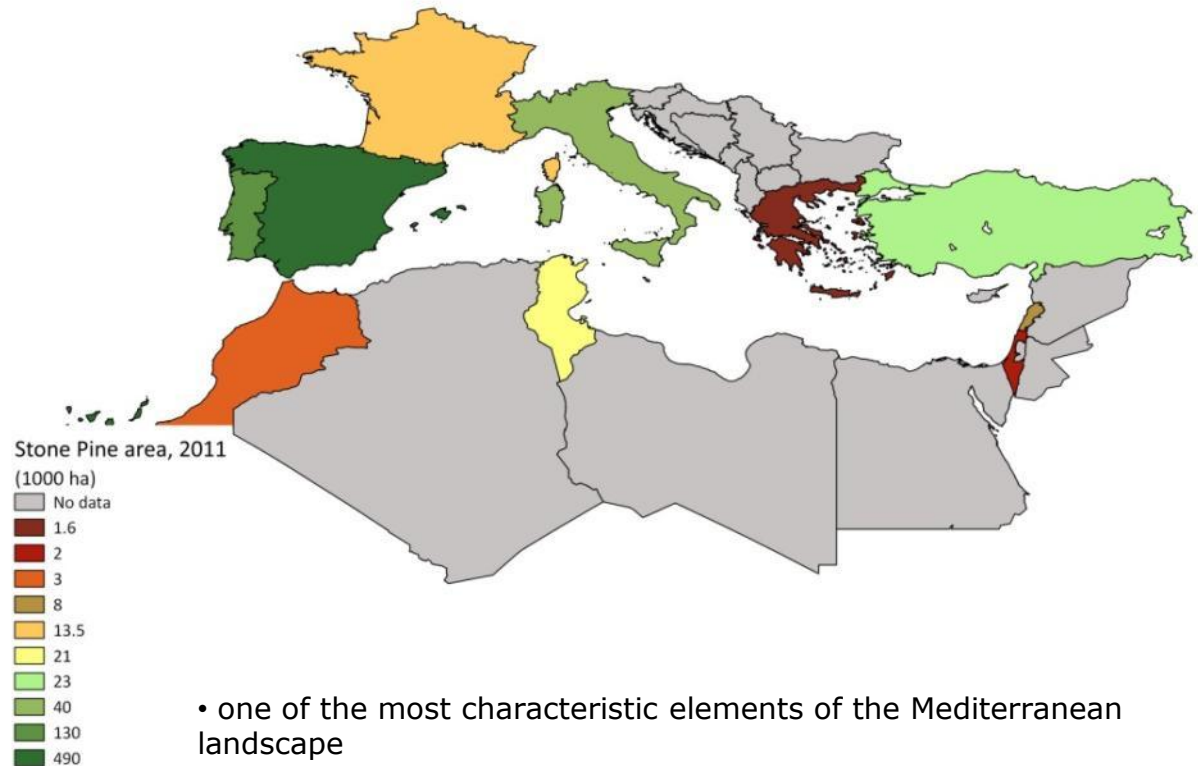


Estimated average production:

- Spain: 1 500 t/yr
- Portugal: 3 500 t/yr
- Lebanon: 1 500 t t/yr
- Turkey: 1 250 t/yr
- Italy 1 000 t/yr

- current price at international markets : **25-30 €/kg for shelled pine nuts**

- retail price **40-60 €/kg**



- one of the most characteristic elements of the Mediterranean landscape
- it occupies **more than 0.75 million ha** of Mediterranean forests
- it was an integral element of the open woodland and steppe habitat dynamics of the late Quaternary before and during the Last Glacial Maximum (50–18 kyr BP)
- human consumption known since the Middle Palaeolithic by charcoals in Neanderthal caves





## Chapter 2. State of forest resources in the Mediterranean region: urban forests and peri-urban forests in the Mediterranean

### *In progress...*

Main aims of urban and peri-urban forestry will be presented in the subchapter.

The new *Silva mediterranea* working group is responsible for the preparation of this subchapter



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### Approach

Drawing a regional outline from data made available by

**FAO's *Global Forest Resource Assessment*** (2010)

and **Forest Europe's *State of Europe's Forests*** (2011) on:

- **Policy, legal and institutional framework** for forest management
- **Human resources** in forest administrations
- **Education and public research**
- Public **policies by area** of concern

**Complementary data** from national reports to UN conventions and mechanisms and documents by GIZ



### Policy, legal and institutional framework (20 countries – 91% of forests)

#### Policies and legislation

All 20 countries have a regulatory framework regarding forests

**14 countries** have a **National Forest Policy Statement** (*framework for the elaboration of coherent laws and policies*)

**15 countries** have implemented **National Forest Programs**, among which **11** since 2000  
⇒ 86% of forests in Mediterranean countries are managed under an internationally recognized framework

**17 countries** have a **dedicated forest law**, **14** have renewed or amended it since 2000

6 countries have a limited regulatory framework (to date, only 1 of the 3 devices above up)

#### Institutions

Forests are generally under the responsibility of the **Ministry in charge of Agriculture**

⇒ Integration of forest and climate change issues ? as the CC issues are under the responsibility of Ministries of Environment





### Human resources in forest administrations (20 countries – 91% of forests)

**77 000 persons working in forest administrations (2008)**

**General decrease of -1.7% since 2000** affecting mostly the technical jobs

**17 000 executive** positions

increasing in the Northern countries

decreasing in the Southern and Eastern countries

**13,5% of female staff**

a slow increase with important differences from one country to another

### Overall decreasing staff

Even though this is not informing on the quality of the management and work done,

It raises the issue of resources availability to develop and implement forest policies



### Education and Public Research

1<sup>st</sup> data collection on education (FRA 2010), with some problems of homogeneity and concerning only 13 countries (60% of forests)

#### Education

**5700 students graduated** in forestry topics in 2008, half at technical level, half at university level

A **third of female** students

**Strong increase** since 2000 : **+26%**,

#### Research

Around **2000** people involved in public forestry research (without data from FR, GR, IT), with 40% holding a PhD

**Stable figure**

Issue of **employment opportunities** for the **increasing number of graduates**, esp. in Southern Mediterranean where forest jobs are mainly in the public sector and the **number of positions are decreasing**, and **youth unemployments rates** are alarming



### Various approaches for policies dealing with forests

In some countries, forests are managed through policies that are **specifically targeting forests**

And focus on:

- **forest cover** : overall stability or some extension planned
- **carbon balance and climate change issues** : carbon sink function of forests, wood as a renewable energy, but very rarely dealing with adaptative forestry
- **health and vitality** of forests, and forest fires issues in particular
- **production and use of wood** : stability or some increase planned
- **production and use of non-wood goods and services** : mostly on recreative services, rarely on non-wood forest products
- **biodiversity and protected areas** : overall extension of protected areas
- **forests' protective functions** : water and soil protection, stream regulation, erosion control

**Progress remains to be accomplished** regarding :

- **Climate change and adaptative forestry**
- Forest management valuating **non-wood forest products**
- And most importantly **governance** : **participatory decision-making processes and management, public awareness**



In some countries, policies affecting forests are mostly **cross-cutting**  
(Algeria, Egypt, Jordania, Lebanon, Syria, Tunisia)

These countries are mostly **arid** and some have **very limited extents of woodlands**

Forests have the status of **national heritage** in most countries

and governments have the objective to protect them, while ensuring the provision of **multiple services**

### **Cross-cutting policies :**

**Desertification:** most countries have elaborated National Action Plans to combat desertification, and all of them include forests, mainly through afforestation campaigns to extend the vegetation cover and reduce anthropogenic pressure on existing forests

**Poverty-reduction policies** with the aim of better **controlling** and **managing resources extraction** (woodfuel, non-wood products, grazing)

### **Some countries are developing forest policies targeting:**

- **Control** of forest resources uses
- Creation and management of **protected areas**
- **Fire control**

Very active National Forest Program in Tunisia

Efforts being done in Lebanon and Algeria for a greater political focus on forests



### Conclusions and recommendations

Updates of legal frameworks and policies development are **indicators** of the national **efforts** put into forest governance, but do not provide insights on how **adapted and efficient** they are

Analysis of forest governance should acknowledge the **variability of national contexts**

#### *For future panoramas:*

An adapted **data collection process is needed**  
especially for countries with forests being addressed through cross-cutting policies

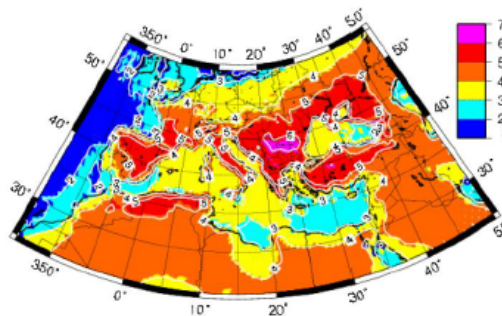
Assessment of **policy implementation and results** ?  
through qualitative indicators, e.g. based on national reports on **policies evaluation**



### *In progress...*

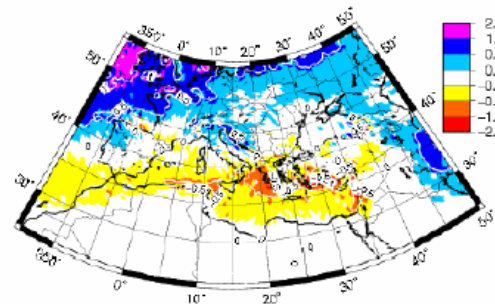
- 4.1. Forest Genetic Resources (FGR): a key issue for adaptation of Mediterranean forest ecosystems
- 4.2. Forest fire prevention under new climatic conditions
- 4.3 Impacts of climate change on insects and diseases in Mediterranean forests
- 4.4. Adaptive management and restoration practices in Mediterranean forests
- 4.5 Climate change mitigation by forests and financing opportunities through the Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism

Surface air temperature (°C) :  
2070-2099 vs. 1961-1990  
Summer



Source: WDI, 2007

Seasonal precipitation (mm/d) :  
2070-2099 vs. 1961-1990  
Winter




### *In progress...*

1. Spain (Valencia: planning of fire prevention activities at local level)
2. France (Maritime Alps: experimental forest management with low-density planting to increase resilience to climate change)
3. Italy (Vesuvio National Park: soil-bioengineering to control soil erosion)
4. Portugal (FSC Certification and Payment for Ecosystem Services in Cork Oak Woodlands)
5. Algeria (Tlemcen: impact of human activities and climate change on forests ecosystems)
6. Maroc (Ifrane: watershed management)
7. Turkey (Yalowa: NWFP, tourism)





A photograph of a lush green field filled with numerous small yellow flowers. In the background, several large, mature trees with thick, gnarled trunks and dense foliage stand against a bright sky. The scene is captured in a slightly soft-focus style, emphasizing the vibrant colors of the flora.

*Thank you for your attention*