

State of Mediterranean Forests (SoMF)

Concept paper



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Back cover photograph: Forest users, Middle Atlas, Morocco. Photo by Nora Berrahmouni.

Forestry Department

Food and Agriculture Organization of the United Nations

Arid Zone Forests and Forestry Working Papers

State of Mediterranean Forests (SoMF)

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Acronyms and abbreviations

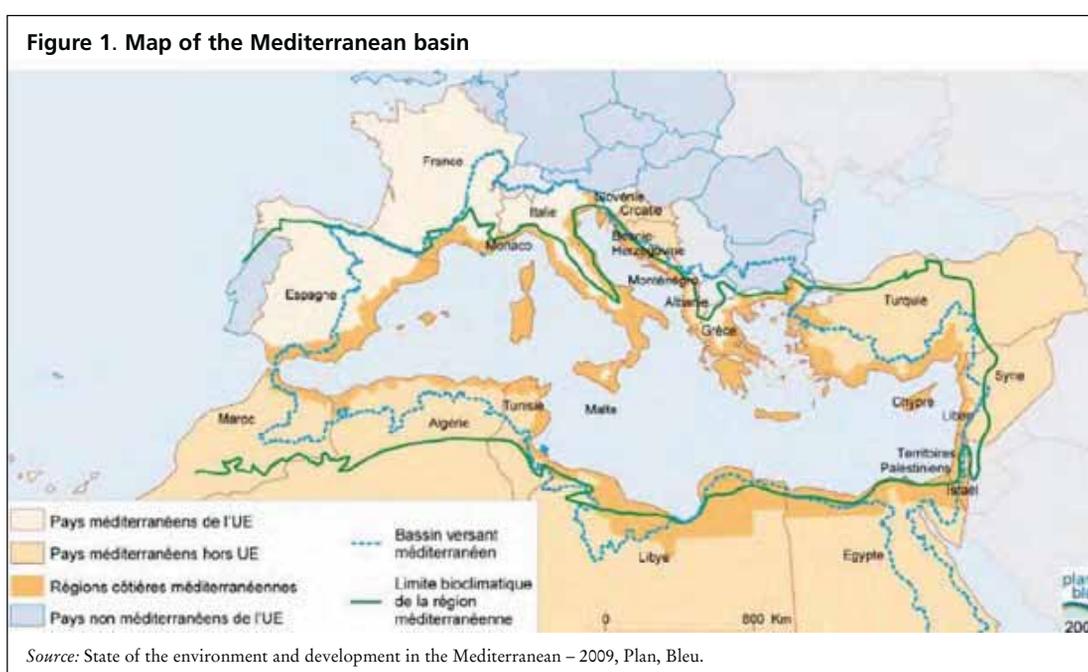
AIFM	Association Internationale Forêts Méditerranéennes
ANR	Agence Nationale de la Recherche
CBD	Convention on Biological Diversity
CIHEAM	Centre International de Hautes Etudes Agronomiques Méditerranéennes
CIRCE	Climate Change and Impact Research: Mediterranean Environment
CMA	Unità di Ricerca per la Climatologia e la Meteorologia Applicate all'Agricoltura
CPF	Collaborative Partnership on Forests
CRA	Consiglio per la Ricerca e la Sperimentazione in Agricoltura
EEA	European Environment Agency
EFFIS	European Forest Fire Information System
EFC	European Forestry Commission
EFIMED	Mediterranean Regional Office of the European Forest Institute
EFT	European Forest Type
FAO	Food and Agriculture Organizations of the United Nations
FOREST EUROPE	Ministerial Conference on the Protection of Forests in Europe
FRA	Global Forest Resources Assessment
INGV	Istituto Nazionale di Geofisica e Vulcanologia
INRA	Insitut National de la Recherche Agronomique
IPA	Important Plant Areas
IPCC	Inter-governmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
JRC	Joint Research Centre
MFRA	Mediterranean Forest Research Agenda
MMFN	Mediterranean Model Forest Network
MFSTEP	Mediterranean Forecasting System. Toward Environmental Predictions
NFI	National Forest Inventory
NFMA	National Forest Monitoring and Assessment
NWFP	Non-Wood Forest Products
OFME	Observatoire de la Forêt Méditerranéenne
OWL	Other Wooded Land
PES	Payment for Environmental Services
RS	Remote Sensing
SEL	Centro di Ricerca per la Selvicoltura
SoEF	State of Europe's Forests
SoMF	State of Mediterranean Forests
UfM	Union for the Mediterranean
UNCCD	United Nations Convention to Combat Desertification
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
URFM	Ecologie des Forêts Méditerranéennes
WCMC	World Conservation Monitoring Centre
WFP	Wood Forest Products
WWF	World Wide Fund for Nature

1. Overview of Mediterranean forests and other wooded lands

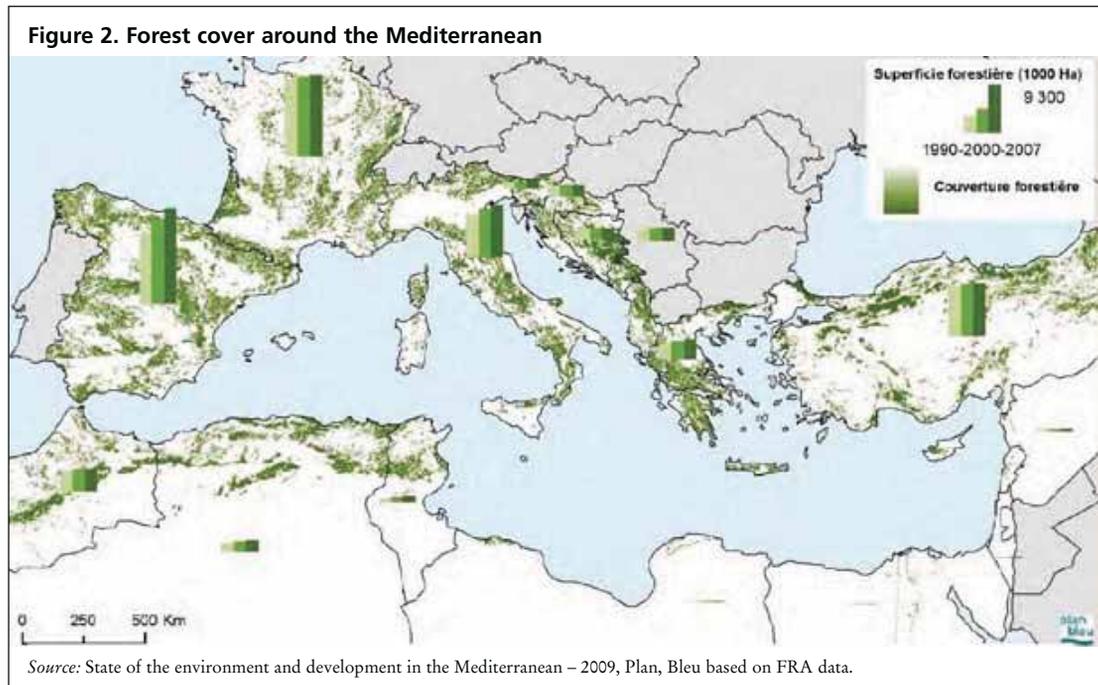
Mediterranean forests are generally characterized by a remarkable set of features and an exceptionally large variation of environmental conditions that make them naturally and aesthetically attractive. Moreover, the Mediterranean forests contain an array of plant and animal species diversity with relatively high genetic variability. This region is one of the world's biodiversity hotspots. Its mosaic of forest landscapes contributes greatly to the outstanding biological richness and multiple values which attract the many tourists that visit the Mediterranean every year. These Mediterranean forest landscapes also contribute to poverty alleviation, the socio economic development of rural areas, food security of local people and the preservation of the multiple environmental services considered today by the international community as of global importance (carbon sequestration, biodiversity, landscape quality, preservation of water resources and fight against land degradation).

Despite their apparent fragility, Mediterranean forest landscapes have been shaped by human activities and have demonstrated for several centuries their strong resilience to changes of anthropogenic origins. However, today they are facing a threat of unprecedented magnitude which they will have to adapt to in the coming decades. Climate change is expected to have significant, if not severe, impacts on Mediterranean ecosystems while at the same time the population of the Mediterranean region will increase significantly by 2050. The main drivers of biodiversity loss in the region are converting natural areas to farming and urban development, introducing invasive alien species, polluting or over-exploiting resources including water and soils and harvesting wild plants and animals at unsustainable levels. This raises crucial questions.

What can be done to ensure that Mediterranean forest landscapes adapt to new social, economic, environmental and climate conditions so that they can continue to provide goods and services on which people depend? How can regional cooperation in this area located at the crossroads of Africa, Europe and Asia help countries respond effectively to the new challenges posed by climate change? How can the Mediterranean region, which is particularly hard hit by global climate change, become in some ways, a laboratory to develop, test and disseminate best practices to promote adaptation of forest ecosystems to climatic changes and other pressures during the twenty-first century?



In the countries to the north of the Mediterranean, natural land ecosystems are seeing the more or less vigorous return of forests (see Figure 2), due to the abandonment of marginal agriculture lands and to reforestation campaigns. In the south, particularly in the Maghreb, the ecosystems are still exposed to increasing anthropogenic pressure of clearing and cultivation of marginal lands, overexploitation of firewood and overgrazing. The south Mediterranean forest and range ecosystems fall mostly in the semi-arid with often poor soils and scarce water. Due to the reigning environmental and climatic conditions, these ecosystems are particularly fragile and vulnerable and one of the most endangered in the world. Many native plants and animal species have become extinct or endangered.



The Mediterranean region comprises 26 countries covering an area of 8.779 million km². While this is equal to 6.7 percent of the world's land area, the region's forest cover amounts to 85 million ha, about 9.5 percent of the countries' total area and 2 percent of the world's forest area. When the other wooded land area is added, the total area of the natural woody vegetation in the Mediterranean raises to 115 million ha which is about 13 percent of the countries' total area. 15 countries with about 28 percent of the region land area account for about 89% of the region forest and other wooded land area (see Table 1).

In the south of the Mediterranean basin, the region is generally under semi-arid to desert conditions, and rural economies are widely hindered by degraded environments. It is characterized by low forest cover – 10 percent or less of the land area is covered by forests. The forest vegetation is generally composed of open woodlands with scattered trees and *xerophytic* shrubs.

The national statistics (see Table 2) show that to the north of the Mediterranean, the forest expansion is in steady increase, while in the countries to the south and east of the Mediterranean basin, despite the limited forest covers, the forest area is seemingly stable with very low positive change. If the national reports are accurate, the Mediterranean countries are generally doing better compared to the world average of -0.18% negative change in the world forest cover.

Table 1. Forest area, other wooded land, rangeland and relevant source (x1000 ha)

Country	Land area	Forest area	Other wooded land	Forest + OWL	Forest + OWL - % of land area	Range (*) area	Source			
							NFI (includes field assessment)	Mapping (+ RS & aerial photos)	Registers and statistics	Expert estimation
Albania	2,875	776	255	1,032	36	345				2007
Algeria	238,174	1,492	2,685	4,177	2	173,867	2003			
Bulgaria ¹	11,100	3,927	0	3,927	35	1,332				2009
Cyprus	925	173	214	387	42	0				2005
Croatia	5,654	1,920	554	2,474	44	1,696				2006
Egypt	100,145	70	20	90	0	0				2009
France	55,150	15,954	1,618	17,572	32	13,788	2006			
Greece	13,196	3,903	2,636	6,539	50	3,959				1992
Israel	2,207	154	33	187	9	441				2008
Italy	30,134	9,149	1,767	10,916	36	4,520	2005			
Jordan	8,878	98	51	149	2	5,771				2007
Lebanon	1,040	137	106	243	23	52	2004			
Libya	175,954	217	330	547	0	149,561				2005
Macedonia ²	2,571	998	143	1,141	44	514				2000
Malta	32	0	0	0	0	0				1996
Monaco	0	0	0	0	0	0				
Montenegro	1,381	543	175	718	52	249				2005
Morocco	44,655	5,131	631	5,762	13	26,793	2005			
Palestine	0	0	0	0	0	0				
Portugal	9,212	3,456	155	3,611	39	2,303	2005			
Serbia	8836	2713	410	3123	35.3	1590.5				
Slovenia	2,027	1,253	21	1,274	63	405				2007
Spain	50,537	18,173	9,574	27,748	55	12,634	2002			
Syria	18,518	491	35	526	3	12,037				2008
Tunisia	16,361	1,006	300	1,306	8	6,544	2003			
Turkey	78,356	11,334	10,368	21,702	28	15,671	2004			
Total	877,918	83,068	32,081	115,151	13,1	434,072.5				

Source: FRA 2010; (*): Estimations from FAOSTAT.

Table 2. Forest area change

Regions	Forest area annual change (1000 ha)		Annual change rate (%)	
	1990-2000	2000-2005	1990-2000	2000-2005
North Mediterranean	542	556	0.32	0.33
South Mediterranean	159	120	0.09	0.07
World	-3802	-4251	-0.22	-0.18

Source: FRA 2005.

1 Although not facing directly the Mediterranean Sea, Bulgaria hosts Mediterranean forest ecosystems.

2 Although not facing directly the Mediterranean Sea, Macedonia hosts Mediterranean forest ecosystems.

2. Socio-economic and historical importance of Mediterranean forests and other wooded lands

Over thousands of years, Mediterranean forests have evolved under the combined impact of the natural environmental factors such as relief, soils, climate and the activities of human society. The civilizations that have succeeded each other around the Mediterranean rim have transformed and shaped all the components of their territories, including the forests and other wooded lands.

Since Antiquity, these lands have provided multiple resources (foodstuffs from hunting and gathering, fodder and grazing for herds, firewood, timber, cattle, cork, etc.) not only for the local rural populations but, also, to the cities to trade and to industry. Stereotype images of “virgin” forest or, in complete contrast, of forest as a “machine for producing wood” are completely unsuited to the Mediterranean. Indeed, the multiple uses are one of the defining characteristics of the Mediterranean forests. A particularly important aspect is the role of herds: in traditional agrarian systems, the livestock grazes a major part of its food in the forest and on other natural land (Mediterranean *saltus*), and fertilizing the cultivated land with the nitrogen and the phosphorus content of their excrement.

In modern time, there has been massive development of urbanization industrialization long-distance low-cost transport and market competition between all the regions of the world. These changes in land-use have caused series of ruptures in the uses of Mediterranean forests and other wooded lands and in the nature of goods and services expected from them.

In the countries of the northern rim, traditional rural uses have largely disappeared. Because of the natural dynamics of woody vegetation, forests and “matorrals” have reconquered large tracts of abandoned agricultural or grazing land. As a consequence, the massive development of the scrub and undergrowth combined with lack of management, heat waves and drought during summers increased enormously the risk of fire.

In the countries of the southern and eastern rim, by contrast, numerous poor rural populations in their struggle to survive must continue to maintain excessively high pressure on wooded lands, ploughing up marginal or erodible land for farming, overexploiting firewood and over-grazing. The whole South is generally characterized by extensive pastoralism, widespread overgrazing and chronic forage deficits. Forests and other wooded lands are, there, widely used as forage reservoir for livestock. From 1967 to 2007, the livestock population grew by more than 200%. The traditional livestock systems contribute to the livelihoods of 70% of the rural poor (Bengoumi, 2010).

As the rural population (see Table 3) is growing steadily, particularly to the south of the Mediterranean, and the life style of people has been continuously improving, the demand for livestock products has significantly risen. Traditional cattle raising in many parts of the Mediterranean region is in constant growth and causing a mounting pressure on the rangelands resources including within forests and other wooded lands. The multiple use of forests including for browsing by extensive cattle raising system in a hazardous environment characterized by low and irregular rainfall, high temperature, prolonged droughts, more frequent forest fires and insects and pests diseases outbreaks, is putting natural ecosystems under real threat of irreversible degradation of plant cover, erosion, desertification and loss of biodiversity. The most effective means of combating these risks is by reducing poverty.

In the north, as in the south and in the east, permanent resident city dwellers and tourists now make new demands on forest and natural land: congenial landscape, leisure in a natural environment, or clearing for urbanization and infrastructure. Such demands are often the sources of conflicts between either non-compatible users or with landowners. Thus, a clear need has emerged for making changes in property rights and uses as well as for designing new procedures of governance.

Table 3. Total population, rural population and livestock statistics

Country	Total Population* (x1000)	Rural Population* (%)	Livestock (Ruminants)**					
			Total (x1000)	Percent				
				Cattle	Sheep	Goats	Camels	Pigs
Albania	3,169	52.0	3,503	18.7	50.2	26.9	0	4.2
Algeria	35,423	33.5	25,740	6.4	77.7	14.8	1.1	
Bulgaria ³	7,497	28.3	4,021	16.9	42.1	17.9	0	23.2
Cyprus	880	29.8	1,084	5.3	24.8	30.4	0	39.5
Croatia	4,410	42.2	2,593	18.2	30.7	4.6	0.0	46.5
Egypt	84,474	57.2	15,162	37.9	33.1	27.9	1.0	
France	62,637	22.2	44,801	43.3	20.5	2.7	0	33.5
Greece	11,183	38.6	16,000	3.8	56.3	33.8	0	6.3
Israel	7,285	8.3	n.a	n.a	n.a	n.a	n.a	n.a
Italy	60,098	31.6	24,559	26.3	32.4	3.8	0	37.5
Jordan	6,472	21.5	3,700	2.0	68.2	29.7	0.1	
Lebanon	4,255	12.8	370	24.3	64.6	11.0	0.1	
Libya	6,546	22.1	5,942	2.2	75.7	21.3	0.8	
Macedonia ⁴	2,043	32.1	1,649	15.1	75.5	0.0	0.0	9.4
Malta	410	5.4	111	16.1	13.4	4.9	0.0	65.6
Monaco	33	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Montenegro	626	40.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Morocco	32,381	43.3	25,155	11.2	67.9	20.3	0.6	
Palestine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Portugal	10,732	39.3	9,838	14.7	55.9	5.6	0	23.9
Serbia	9,856	47.6	n.a	n.a	n.a	n.a	n.a	n.a
Slovenia	2,025	52.0	1,101	41.0	8.5	2.0	0	48.5
Spain	45,317	22.6	57,002	11.3	39.9	5.1	0	43.7
Syria	22,505	45.1	24,070	4.9	84.3	10.7	0.1	
Tunisia	10,374	32.7	70,000	1.0	10.9	2.2	0.3	
Turkey	75,705	30.4	n.a	n.a	n.a	n.a	n.a	n.a

Source: FRA, 2005 (*); Bengoumi, M., 2010 (**).

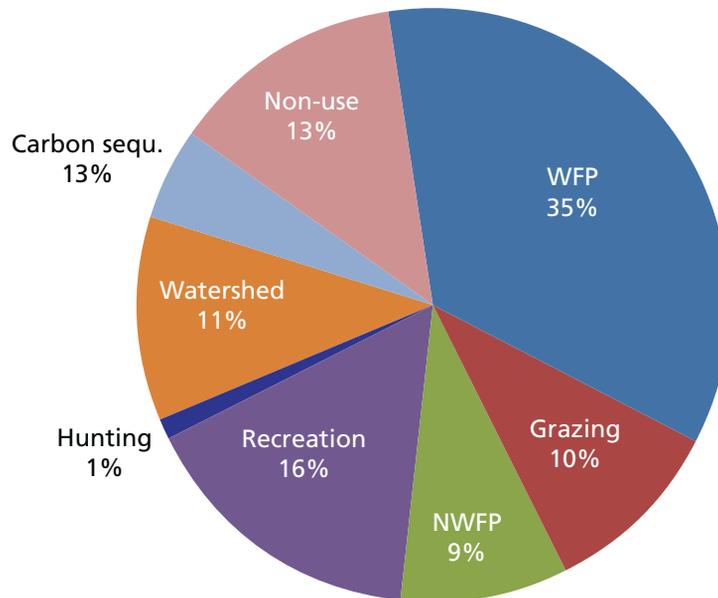
For a long time, “ecological services” provided by forests and other wooded lands (soil and water protection, biological diversity of flora and fauna, climatic buffer) were regarded as normal consequences of wise forestry management. Moreover, the forestry administrations in various Mediterranean countries have already undertaken specific action for reforestation, soil protection, reclaiming landscape, fighting erosion and desertification, watershed management and the protection of rare or endangered species. But it is only quite recently that awareness was raised on the economic value of these services, and of the need to manage them sustainably as such, in particular under the aegis of international conventions for combating desertification (UNCCD) and for the conservation of biodiversity (CBD).

Concerning the total economic value of Mediterranean wooded lands, it is important to point out that the production of commercial, non-commercial and self-consumable goods, as well as the management and protection of the capability for delivering environmental services, equate to providing employment (see Figure 3). Such “jobs” result in direct income (marketable goods and services), shadow remuneration (self-consumption), indirect income through connected products (tourism services, increase values of houses, etc.), or be financed through taxes and other fiscal measures whose importance is growing in many urban areas.

³ Although not facing directly the Mediterranean Sea, Bulgaria hosts Mediterranean forest ecosystems.

⁴ Although not facing directly the 4 Mediterranean Sea, Macedonia hosts Mediterranean forest ecosystems.

Figure 3. Composition of the total economic value of Mediterranean forests



Source: MFRA 2010-2020, data from Merlo & Croitoru, 2005.



Photo by Roberto Graffi

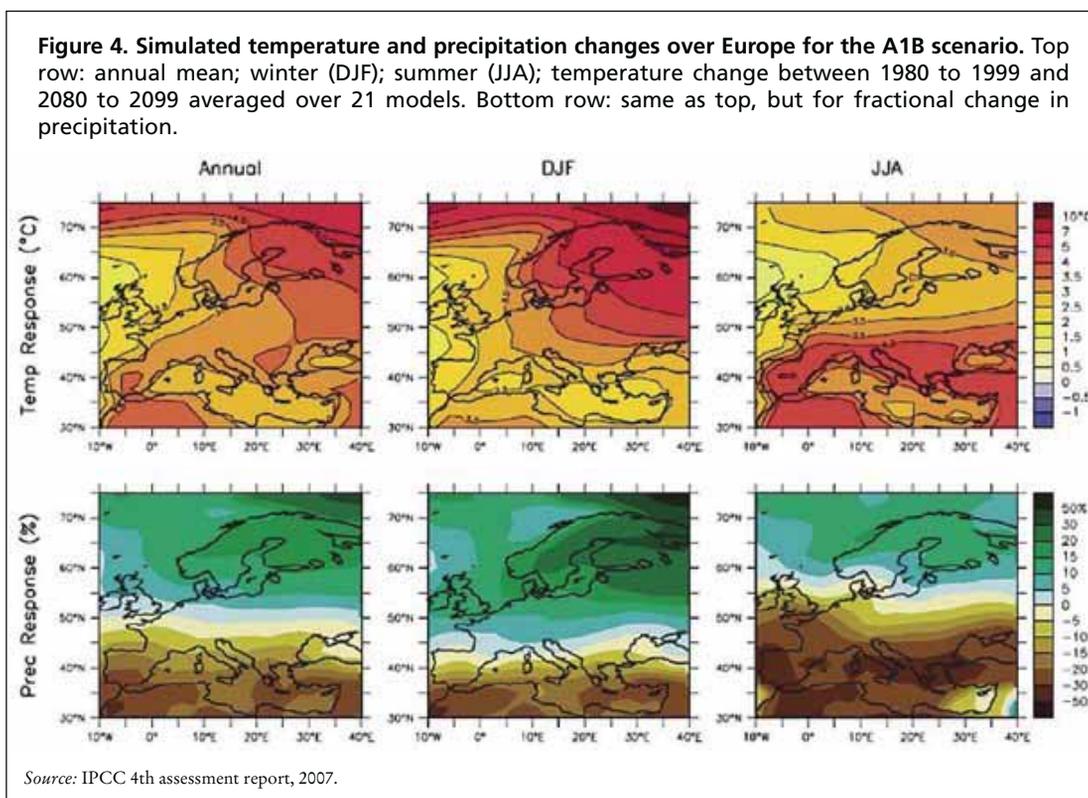
Workers in a cork oak forest in Sardinia, Italy

3. Threats and challenges faced by Mediterranean forests and other wooded lands

Although world temperature-change scenarios vary regionally, they show a clear trend towards warming. The temperature increment from 1850–1899 to 2001–2005 has been 0.76°C on a global scale; in some Mediterranean countries, however, the increment from 1971 to 2000 was 1.53°C – a much higher value than the 1.2°C predicted by the climate models. In addition, simulations of future climate scenarios (see Figure 4) tend to agree that higher emission levels could produce a temperature increase higher than the global average value, further reduce precipitation (of up to 20%) and increase the interannual variability of both temperature and precipitation (floods, droughts and heat waves). Predictions announce that the region will likely enter into an era of severe water stress due to predicted decrease of annual precipitations, especially in the south but also in some parts to the north of the Mediterranean. The natural ecosystems will likely suffer most.

The Mediterranean vegetation includes 25,000 plant species, representing 10% of the world's flowering plants on just over 1.6% of the Earth's surface. It is also the second world leader in plant endemism, with an estimated 50% (13,000) of these species found nowhere else on Earth. Species groups with a pan-European distribution, such as fir, beech, pine and oak have the highest species diversity in the Mediterranean region, and the Mediterranean populations are often the most variable in terms of genetic diversity. Furthermore, Mediterranean forests also host an amazing faunal diversity, especially when expressed by the ratio between species richness and area.

Forests provide vital environmental services – soil, water catchments, carbon sequestration, timber, food and medicine, stabilization of urban microclimates, recreation, etc. – on which society depends. This is extremely significant in extreme environments like the Mediterranean climate, where water shortages constitute the main limiting factor and the irregular distribution of water can easily activate soil erosion and water run-off if forest cover is lost. Rapid and abrupt land-use changes, mainly due to development



pressures and urban sprawl, habitat fragmentation, resource overexploitation and poor management, are the main drivers of Mediterranean forest degradation. Climate change adds to these pressures, mainly through an increased incidence of heat waves, droughts and overall temperature rise, and could eventually overstretch the resilience and adaptive capacity of the Mediterranean forest ecosystems. Forest wildfires are among the most direct and immediate consequence of climate change upon Mediterranean forests, and climate change impacts, such as extended periods of drought and extreme meteorological phenomena (heat waves and strong winds), combined with unsustainable changes in land use, bad management practices, lack of awareness and lack of adequate fire management strategies, are contributing to the alarming trend of increased frequency, intensity and extent of fires.

Climate change, compounded by “maladaptive” processes and inadequate land uses (e.g. unsustainable rapid land-use changes, rural abandonment and overexploitation of land resources), are likely to reduce the adaptability of Mediterranean forest to autonomously accommodate climate change, and increase the frequency and intensity of pathogen outbreaks, dieback events, uncontrolled fires and other large-scale disturbances; the Mediterranean people and economies will be chiefly affected by the diminishing of forested areas, usually replaced by fire-prone shrub communities, increased landscape fragmentation, which may consequently impede migration/dispersal opportunities for a number of species at risk of extinction, and decrease of annual increments and the subsequent income from forests. The possible conflict between intensive forest production and biodiversity conservation may also represent a threat to monitor. Yet, because of their low productivity, Mediterranean forests and other wooded lands are probably less at risk than other ecosystems.

In light of the above all Mediterranean countries urgently need to mainstream fire risk reduction and climate change adaptation needs into all sectoral policies, regulations and rural/urban development plans linked with forest ecosystems, at the national and regional levels. Additionally, Mediterranean countries need to jointly develop, assess the effectiveness, and fine-tune climate change adaptation strategies and tools. To this aim, Mediterranean cooperation mechanisms at all levels are called to improve knowledge sharing and scientific research, develop capacities and partnerships for the implementation of adequate climate change adaptation processes in terms of conservation of biodiversity and cultural values, and nature resource management.



Photo by Thomas Hofer

Typical agricultural system in the High Atlas, Morocco

4. State-of-the-art knowledge about Mediterranean forests and other wooded lands

There are many existing sources of information regarding Mediterranean forests; yet, divergent specific objectives of data collection processes make the resulting information fragmented and valid only at the sub-regional level.

FAO has been monitoring the world's forests at 5 to 10 year intervals since 1946. The Global Forest Resources Assessments are based on data that countries provide to FAO in response to a common questionnaire. FAO then compiles and analyses the information and presents the current status of the world's forest resources, their management and uses as well as changes over time. The FRA 2010 report is currently being finalized. National reports collected from

Mediterranean countries for compiling the Global Forest Resources Assessments represent a unique source of data. Moreover, Mediterranean countries are engaged in national forest inventories and monitoring and assessment exercises that, in spite of their richness in terms of data, present some difficulties for extracting valid information at the regional scale. In fact, national inventories differ from country to country, indicators around which data are collected may vary according to specific country needs and the data quality level is subject to substantial oscillations depending on resources available to undertake such exercises. Countries may report data not making any distinctions between Mediterranean rim forest ecosystems and other forest ecosystems, such as alpine forests. As a result, information resulting from national inventories is not harmonized and does not allow a valid comparison. In many cases, along the southern and eastern shores of the Mediterranean, national forest inventories are not implemented at all. Figure 5 shows the European biogeographical regions; ideally data on forests collected by countries should be diversified taking into account the geographical border of the Mediterranean ecological area, in the northern as well in the southern and the eastern Mediterranean rim.

In some cases the precision and accuracy of the data are unknown; consequently, scenario development and planning may be inaccurate as proper knowledge for decision making is lacking. Upon request, FAO supports countries in their efforts to close knowledge gaps by implementing field inventories and establishing forest information services. FAO's programme to support holistic and cost efficient National Forest Monitoring and Assessment has been active since 2000 in a growing number of countries and progressively included Integrated Land Use Assessment.

In addition, there are a number of regional processes, organizations and research projects (either on-going or recently completed) that collect data and compile information relevant to Mediterranean forests and related issues, such as AIFM, Bioversity International, Blue Plan, CIHEAM, CIRCE, CRA-CMA and CRA-SEL, EFIMED, FAO *Silva Mediterranea* Committee, FOREST EUROPE, IUCN, JRC (in particular EFFIS for forest fires), MFSTEP coordinated by INGV, MMFN, OFME, Plantlife International and IPA Database, UNECE, UNEP-WCMC, URFM of INRA, WWF, Woody project led by ANR, etc. The three Rio Conventions – CBD, UNCCD and UNFCCC – are all relevant and important for the region. The Union for the Mediterranean represents a further thrust and a reinforced institutional framework for regional cooperation on forest issues. Yet, each of these entities looks at the subject from different angles of view, collecting data in response to specific questions and needs or with a geographic focus which only embeds a part of the Mediterranean rim, e.g. the “State of Europe's Forests”, a report on sustainable forest management in Europe jointly prepared by FOREST EUROPE, UNECE and FAO and based on both quantitative and qualitative indicators.

In order to assemble comprehensive, harmonized and validated information throughout the Mediterranean edge, there is a need to design and implement a new approach which is able to bring together and build upon existing processes and actors and move on towards a thorough monitoring of forest resources and policies based on a complete set of indicators comparable at the regional scale.



5. SoMF: a new regional process to fill information gaps

As a first step, the existing situation needs to be valorized, synthesizing information from available data and making it available to a larger audience than the single processes' specialists and users, which entails a harmonized language coherent with a more comprehensive and holistic approach sticking to FRA definitions and concepts. This stock-taking exercise is supposed to highlight missing data on important indicators of environmental, social and institutional change impacting on Mediterranean forests as well as substantial differences of level of data available and of methodology used to collect them depending on individual countries' factors. Therefore, in order to move toward a more comprehensive and thorough monitoring system of the state of Mediterranean forests, there is a need to first identify relevant missing indicators in data collection processes and, building on the existing platforms, to put the basis for a sustainable process aimed at developing information on newly identified indicators and knowledge needs.

As an example, under the umbrella of FRA 2010 and together with members of the Collaborative Partnership on Forests and other partners, FAO has initiated a special study to identify the elements of forest degradation and the best practices for assessing them, being the objectives of the initiative to help strengthen the capacity of countries to assess, monitor and report on forest degradation mainly by harmonizing definitions and identifying specific elements and indicators of forest degradation. Mediterranean forests may have great relevance and potential for pilot testing the methodologies and indicators identified by this consultative exercise.

Conservation and management of forest genetic resources are crucial for adaptation of Mediterranean ecosystems to climate change. Although many trials have been carried out on Mediterranean forest species, research and information are fragmented and not sufficiently available for developing strategies for adaptation and mitigation.

It is of high importance for Mediterranean countries to develop an efficient network to deal with this issue, in particular through:

- Compiling information on climate change impacts on Mediterranean forest genetic resources and forest ecosystems;
- Making information available on these gene resources for preparing adaptation strategies and other programmes;
- Selecting criteria, methods and protocols for monitoring and conservation of forest genetic resources (particularly in rare and endangered species), and for their use to reduce vulnerability.

Certain priorities have been identified within the Mediterranean Forest Research Agenda 2010-2020, which EFIMED drawn out of the Strategic Research Agenda of the Forest-Based Sector Technology Platform. As regards the impact of climate and land-use change on the functioning of Mediterranean forest ecosystems and the resulting need to assess and monitor the main physical and biological processes including biodiversity; two monitoring approaches are presented in the MFRA 2010-2020:

- Long-term ecosystem monitoring and experiments (pilot sites) on the effects of global change in natural and planted forest ecosystem processes. The following should be established: forest-atmosphere flux stations; instrumented watersheds; water and nutrient cycling; different types (from extensive to intensive) of comparable monitoring sites that effectively cover the forest typologies as well as the geographical and climatic diversity of the region.
- Monitoring, understanding and modelling interactions between forests and microorganisms and insects: symbionts, pathogens, pests as related to climate change.

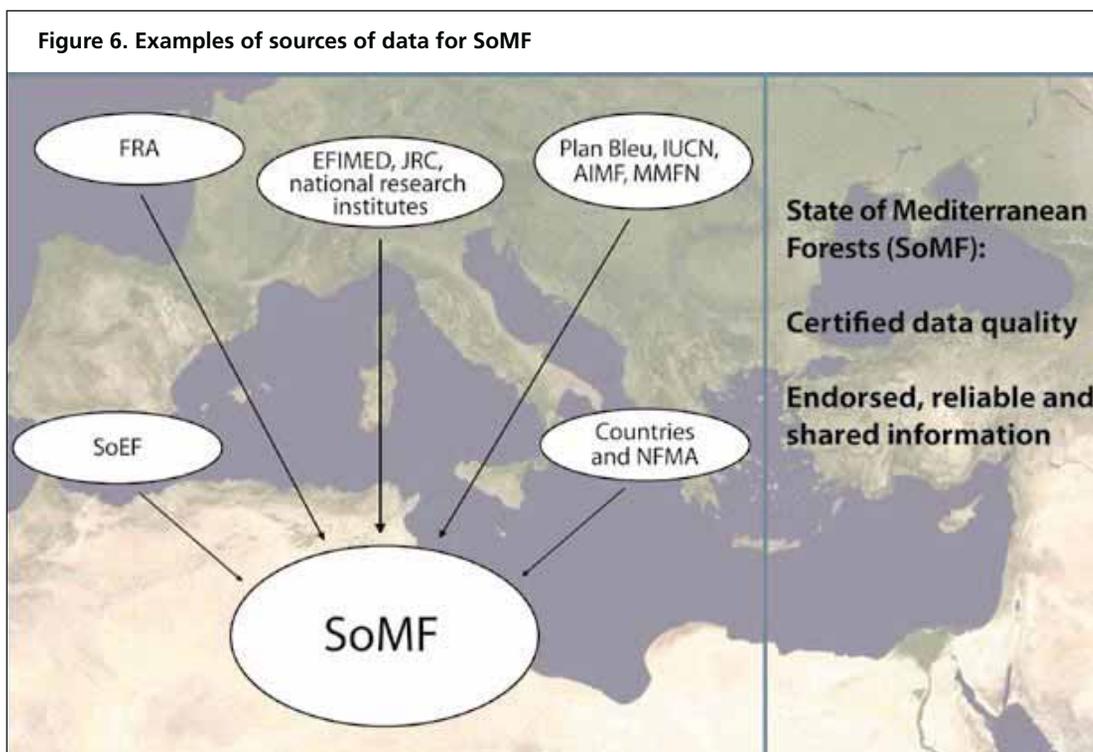
Indeed, Mediterranean forests and other wooded lands are expected to be increasingly exposed to environmental and anthropogenic threats and pressure whose relevant parameters need to be monitored for several reasons. Forest resilience and adaptation to climate change impacts, including forest genetic resources and biodiversity conservation, pose a major challenge. Preliminary consultations with

relevant experts revealed that the following priority information needs call for deeper knowledge and understanding of trends, root causes, possible impacts on society and appropriate countermeasures:

- Assessment of forest fire risks;
- Water scarcity;
- Mapping of different risks and potential hazards (floods, droughts, pests, etc.);
- Forest degradation;
- Shifting of forest areas;
- Soil degradation and desertification;
- Meteorological forecasting and modeling;
- Trade of timber and non-wood forest products;
- Monitoring and modeling of forest genetic diversity and adaptation;
- Carbon stock and greenhouse gas inventories.

Information developed consistently with these needs would help measure impacts of public policy and regional cooperation processes, evaluate the prediction capacity and accuracy of current modelling by comparing scenarios with data collected as well as understand and apply principles of resilient and opportune adaptive management. As a matter of fact, in the context of global change questions such as “are Mediterranean tree and shrub species adapting to climate change and increased water scarcity?” or “how fast are forest management and forestry practices adapting to environmental changes?” rise to unprecedented levels of importance.

Within the institutional framework provided by, inter alia, *Silva Mediterranea* and the Union for the Mediterranean, new data and information needs encounter positive grounds for being properly addressed and fulfilled. The overall idea and proposition for a newly established “State of Mediterranean Forests” has been endorsed by the Enlarged *Silva Mediterranea* Executive Committee during the meeting held in Antalya, Turkey, on 14-15 April 2010 and will feed into the Strategic Plan of the Integrated Programme of Work on timber and forestry of the UNECE Timber Committee and FAO European Forestry Commission. Additionally, the preparation of the State of Mediterranean Forests has been warmly recommended by the scientific community on the occasion of the PARMENIDES III Conference held in Alexandria, Egypt, on 21-24 June 2010. As shown in Figure 6, the monitoring platform will

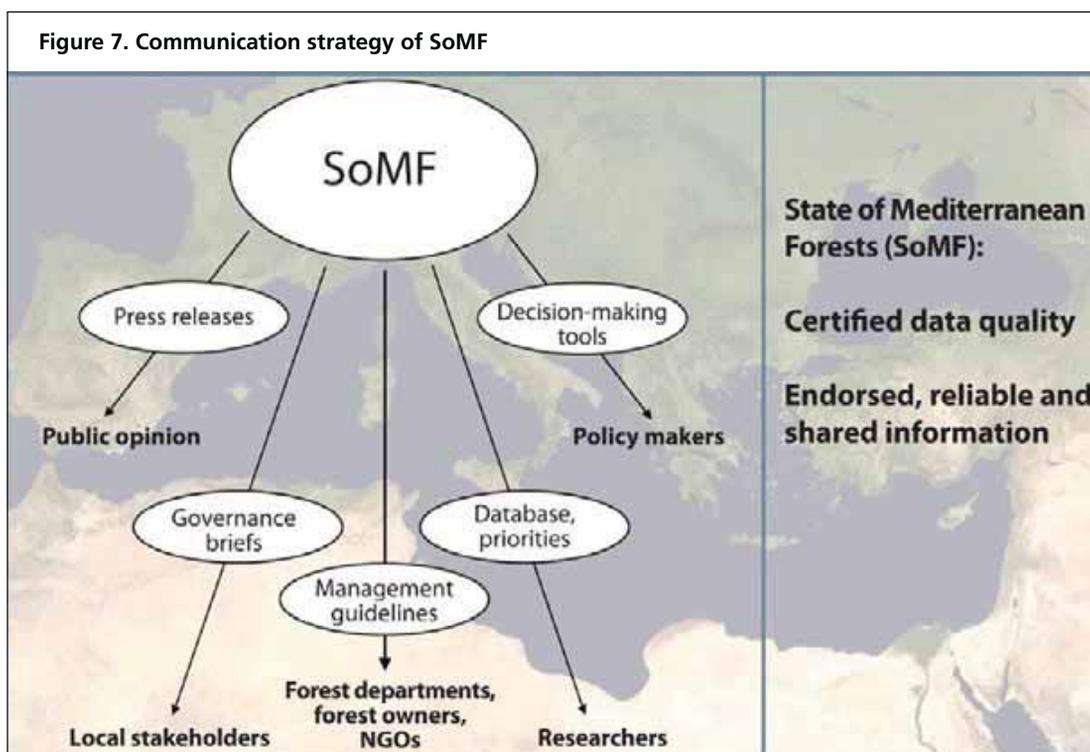


build upon and complement existing processes such as FAO's FRA and NFMA programme, SoEF, national data compiled according to IPCC guidelines for reporting to UNFCCC and other emerging methodologies for monitoring carbon stock and GHG emissions, etc., and, similarly to them, will produce a regular report every five years. Through interacting with national inventory exercises will contribute to strengthening the countries' monitoring capacity.

Primary objectives of the State of Mediterranean Forests are to enhance communication and strengthen partnership on forest issues at the regional level, targeting several categories of actors and stakeholders and providing them with relevant information and a consolidated and shared vision of what is at stake. By fostering clear and transparent dissemination of information, SoMF will offer an ideal platform for discussion and decision-making based on reliable data, common objectives and trustworthiness. As illustrated in Figure 7, the wealth of information produced and presented in the regular report will make it possible to develop specific communication tools tailored to diversified users and stakeholders. The expected outcomes are wide and substantial. As far as policy is concerned, through up-to-date decision-making tools policy makers will receive assistance in designing and putting in place more responsive and adaptive legislations; a comparative analysis of existing forest legislations will help respond to critical questions such as "are current legislations flexible enough to adapt to global change, e.g. climate change, and to facilitate new financial mechanisms, e.g. PES?".

Researchers will be facilitated in identifying knowledge gaps and research priorities; forest managers (from both state departments and private sector) will be supported in the adoption of better management practices able to embrace emerging approaches, such as payments for environmental services, and shifting market trends, for instance pursuing NWF trade opportunities. Educators and trainers will take great advantage from the information made available.

In the framework of regional cooperation and the Union for the Mediterranean, SoMF will make a contribution to identify priority actions and assess the impacts of cooperation programmes. It will serve as a tool for donors to address disbursement of funds in the proper direction.



Besides threats affecting the entire region (climate change, wild fires, etc.), attention is to be paid to threats that are more localized, but potentially very harmful, such as urban sprawl or poor infrastructure (for transport, tourism, etc.). These threats are likely to materialize near densely populated areas where the benefits and environmental services provided by forests can play a role more significant than elsewhere (natural infrastructure for water supply, depollution, phytoremediation, etc.). SoMF will represent an important resource for local stakeholders, making them aware of the value of forests for society, of the importance of environmental services provided by forests and the management needed to ensure such services. It will provide a basis for the integration of forests into the territorial development.

In connection with local governance, there is high potential for SoMF to be partner of the Mediterranean Model Forest Network. The main purpose of MMFN is to define, articulate and manage a regional program of work related to the sustainable management of forest-based landscapes and natural resources that reflects the priorities, strengths and opportunities that are unique to the region. It also facilitates regional communications and knowledge exchange, capacity building and funding opportunities. Model Forests are based on a flexible approach that combines the social, cultural and economic needs of local communities with the long-term sustainability of forest landscapes. Nine countries are actively pursuing Model Forest development in the Mediterranean basin with Urbión Model Forest (Castilla y León, Spain) as the lead coordinating agency. MMFN would be an ideal partner in providing information on the management of landscapes and territorial units where different economic sectors cohabit as well as a source of site-specific data in relation to issues that cannot be monitored at the national level as, for instance, the state of forest genetic resources. MMFN can help better understand how local governance evolves, how forest management is carried out by state forest services at the local level and what the practices of stakeholders and forest users are. It is important to get insight into how mayors, forest owners, farmers, cattle breeders, consumers of fuel wood, tourist boards and overall people benefiting from protective functions of forests discuss and agree on different uses of forests.



Landscape, Turkey

6. Objectives, methodology, calendar and budget

To recapitulate, the SoMF process will entail a reconnaissance of the state of the art in terms of data available, on-going relevant projects and institutions appointed to produce information on forests in the Mediterranean. Screening the range of information currently analyzed will provide an overview of the methodologies used for collecting data (e.g. questionnaires compiled by national correspondents, remote sensing surveys, etc.) and for data processing. This inventory will allow to identify information gaps and needs and to refine objectives and methodology of SoMF. Hence, the process will initiate to collect new data and elaborate additional information, for instance through refined FRA and SoEF questionnaires specifically tailored to Mediterranean countries, which are able to capture the uniqueness of the region's forest ecosystems and related socio-economic issues. The final goal will be the publishing of a regular report on a five-year basis.

The calendar for the development of SoMF foresees a consolidated and synthetic concept based on comments from relevant experts to be presented to *Silva Mediterranea* Member States and partner institutions in October 2010 in Rome, on the occasion of the Twentieth Session of the FAO Committee on Forestry. The first SoMF report is expected to be ready by the end of 2011/beginning of 2012 and will be regularly prepared every five years, therefore the second report will be published in 2016, keeping the pace and complementing FRA and SoEF processes.

The first report will be based on analysis of data already available, in particular from FRA 2010, SoEF 2011 and existing research projects and institutes, and will aim to present new indicators identified for the second report in 2016, a goal which is meant to be achieved through a consultative approach. In case of difficulties in obtaining data on forest resources, for instance due to inexistent national forest inventories, remote sensing combined with detailed plots will be necessary.

In particular, the process of the State of Europe's Forests offers very interesting opportunities of synergy and complementarity with SoMF. At the FOREST EUROPE Conference in Vienna in 2003, it was decided at the ministerial level to report "by forest type", and FOREST EUROPE pursued that decision through consultation activities with member countries to discuss the potentials of applying the European Forest Types as a forest type framework for pan-European reporting. Several meetings and workshops focused on refining the forest type classification. It is expected that reporting on criteria and indicators of sustainable forest management by forest types (i) will allow the reporting of complex data into logical, understandable and ecologically relevant units; (ii) has a potential for better integrating forest data in a wide range of policies (e.g. policies concerning land-use planning, environment, climate, biodiversity, agriculture or water); (iii) has potentials to be used in assessing climate change effects on forest ecosystems, including biodiversity, and serve further harmonizing of European forest monitoring activities. In this connection, a technical workshop on "Reporting using the new European forest types" was held in Bordeaux, France, on 19-21 May 2010. On that occasion, experiences on pilot application of European Forest Types in national reporting were presented and opportunities for applying forest types in processes such as SoEF and FRA were discussed along with suggestions for improving the EFT classification, now counting 14 types.

SoMF will fit this context bringing along additional thrust and complementing the on-going process. SoEF will most likely adopt EFT classification for future questionnaires to be filled by countries and SoMF could extend the exercise to southern and eastern Mediterranean countries, once specific forest types are identified for the sub-regions. Using data concerning the north Mediterranean sub-region resulting from SoEF questionnaires, and complementing them with data on the southern and eastern rim specifically retrieved for SoMF, a more thorough assessment of the state of Mediterranean forests can be achieved. The questionnaires used for SoMF will have first to adopt the additional relevant indicators that SoEF takes into account with respect to FRA, and then to include requests for data on identified sub-region-specific forest types. Ideally, starting from the data collection exercise for FRA 2015 the three processes, i.e. FRA, SoEF and SoMF, would merge their efforts and timing preparing together single

questionnaires for European and Mediterranean countries, which are able to serve the multipurpose objective of feeding the FRA report as well as the SoEF and SoMF reports, taking into account the different needs and peculiarities of each process and including FOREST EUROPE qualitative indicators and data reporting by forest types (specifically tailored to sub-regional biogeographical features).

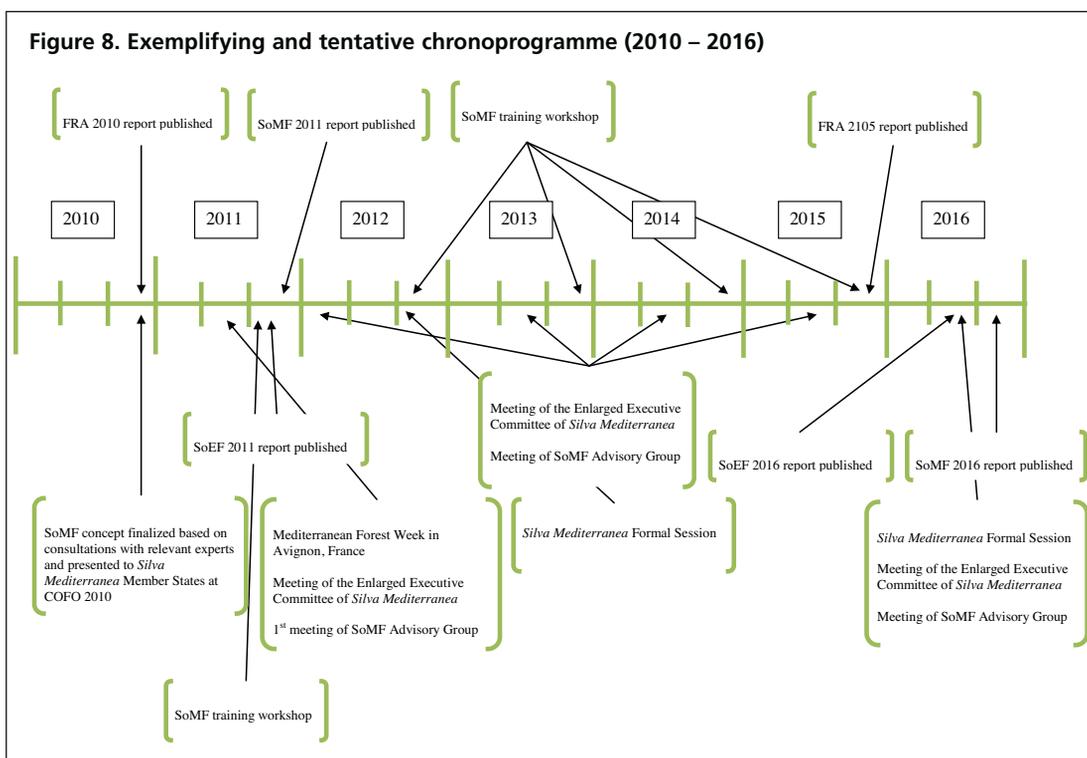
As a consequence of climate change, Mediterranean climatic conditions will probably shift northwards into other European areas in the near future determining the spread of typical Mediterranean forest and other wooded land ecosystems over different European ecological zones. It is of mutual interest for European and Mediterranean countries to develop an effective classification of Mediterranean forest types and to set up an efficient system to monitor and report on conditions and successional trends of Mediterranean forest types.

Complementing and building upon existing processes, SoMF will aim to minimize the costs connected with its implementation. North Mediterranean countries are already engaged in the State of Europe's Forest and are pilot testing the reporting by forest types in view of their adoption in SoEF 2016. It will be necessary to strengthen the capacity of national forest services in south and east Mediterranean countries, in order to enable them to report according to relevant FOREST EUROPE indicators and identified forest types. These countries will need to participate in future discussions aimed at refining the EFT classification and to agree upon working categories for reporting on their own forest types in a harmonized way. Funding opportunities within cooperation mechanisms at the Mediterranean level must be sought to support south and east Mediterranean countries in their effort to improve and harmonize their national forest inventories, monitoring and assessment systems. To facilitate this process at the national level, SoMF will include regular annual training workshops.

The organigram and the calendar for the development of SoMF will follow the timing, structure and programme of work of *Silva Mediterranea* taking advantage from meetings recurrently scheduled in order to simplify logistics, enhance opportunities to gather relevant experts and minimize costs. In this connection, the SoMF Advisory Group will be made up of Members of the Enlarged Executive Committee of *Silva Mediterranea* plus a number of external experts belonging to research institutes and development cooperation agencies concerned with Mediterranean forest issues, and will gather once a year on the occasion of the annual meetings of the Enlarged Executive Committee, which are organized back to back with events of the European Forest Week. *Silva Mediterranea* Formal Sessions (every four years) will also represent milestones in the deployment of the State of Mediterranean Forest process. Tentative chronoprogramme and budget of SoMF are presented in Figure 8.

Table 4. Tentative budget 2011 – 2016 (to be reviewed and finalized)

	Quantity	Cost x unit (US\$)	Total (US\$)
P-3 FAO Staff for 6 years	1	700 000	700 000
Training workshop	5	10 000	50 000
Advisory Group meeting	6	15 000	90 000
Report translation	3	25 000	75 000
Report editing and publication	4	30 000	120 000
National expert for 3 months	11	10 000	110 000
TOTAL			1 145 000



*Presentation of the SoMF concept at a *Silva Mediterranea* meeting during the FAO Committee on Forestry (COFO), October 2010*

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Mediterranean forests are considered as one of the biodiversity hotspots in the world. They provide a diversity of forest products (wood and non-wood forest products) which are the basis for socio-economic development in the Mediterranean, contributing therefore to food security and poverty alleviation in rural areas. Furthermore, if well managed, Mediterranean forests provide also valuable environmental services such as the conservation of soil and biodiversity, buffering against climate change and desertification, water table recharge and run-off control.

Mediterranean forests are expected to be increasingly exposed to human pressure and climate change. Monitoring the status of Mediterranean forests as well as the contributing factors to their conservation or degradation, is a major step for the Mediterranean forest community in defining adaptation strategies to the environmental and socio-economic changes and issues. It is also key for designing a coherent and integrated strategy for the conservation and restoration of the valuable environmental, social, economic and cultural values of Mediterranean forests.

There are many existing sources of information regarding Mediterranean forests; yet, divergent specific objectives of data collection processes make the resulting information

fragmented and valid only at the sub-regional level. Mediterranean countries are engaged in national forest inventories and monitoring and assessment exercises that, in spite of their richness in terms of data, present some difficulties for extracting valid information at the regional scale.

To face this gap, the committee on Mediterranean Forest Questions (*Silva Mediterranea*) of FAO identified the urgent need to launch the preparation of the State of Mediterranean Forests (SoMF) to enhance communication and strengthen partnership on forest issues at the regional level. Several categories of actors and stakeholders would benefit from a consolidated and shared vision of the issues at stake and the information presented in the State of Mediterranean Forests. By fostering clear and transparent dissemination of information, SoMF will offer an ideal platform for discussion and decision-making based on reliable data, common objectives and trustworthiness. SoMF will build upon and complement existing processes and will be implemented together with actors active in the region. This working paper presents the concept and the process to be put in place to achieve a thorough monitoring system on forest resources and policies in the Mediterranean, based on a complete set of indicators comparable at the regional scale.

