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European Environment Agency



The use of new technologies and open data to better support restoration and sustainable management of forests

Thematic session

Monday 21st March 2022 – 11:00am – 12:30pm (GMT+3)

The VII Mediterranean Forest Week, Antalya, Turkey, 22-25 March 2022

Hybrid event: on site and online

Organizers of the thematic session: EEA and ETC-UMA



UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional

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A way to make Europe



The Mediterranean Forest Weeks

Held every two years, the Mediterranean Forest Week (MFW) brings together a multidisciplinary set of actors engaged in Mediterranean forest activities in one of the most vital fora on Mediterranean forests. The main scope of the MFW is to strengthen cooperation amongst the research community, policymakers and other relevant stakeholders by providing a common regional platform for dialogue in the management of Mediterranean forests. The MFW also promotes Mediterranean forests worldwide and calls attention to the specific challenges these forests face. Participants include forest administrators, scientific and academic communities, the private sector, forest owners, investors and key donors, young professionals, civil society, media, environmental agencies and non-governmental organizations. The last MFW in April 2019 in Brummana, Lebanon, brought together around 220 participants from 31 countries on the topic of the role of Mediterranean forests in the Paris Agreement. Past MFWs were characterized by different themes and topics on Mediterranean forest subjects which were discussed through a participatory process during the Week to get to signed and approved final declarations. These declarations provided recommendations, indications, actions and decisions to undertake in the management of Mediterranean forests. Previous MFWs took place in 2010 in Antalya (Turkey), 2011 in Avignon (France), 2013 in Tlemcen (Algeria), 2015 in Barcelona (Spain), 2017 in Agadir (Morocco), and 2019 in Brummana (Lebanon), and the 7th MFW will be hosted by Turkey in March 2022.

The Seventh Mediterranean Forest Week

Mediterranean forests are part of multifaceted landscapes but strongly affected by centuries of human intervention. Despite an increase of 1.8 million hectares of forest between 2010 and 2015, there are 80 million hectares of degraded land, including forests, in the Mediterranean. Under such circumstances, forest ecology restoration may be an important action to restore these lands and consequently bring them to a level of health and vigor and facing the threats due to global changes.

The importance of the ecological restoration actions in natural ecosystems is also recalled by the recent United Nations initiative (i.e., UN Decade on Ecosystem Restoration 2021-2030). Mediterranean forests also provide valuable non-wood forest products (cork, chestnut, nuts, resins, mushrooms, aromatic and medicinal plants) and multiple ecosystem services (soil erosion control, water regulation, carbon sequestration, biodiversity conservation, microclimate regulation), some, but not all, have been included in robust value chains to reach the market. For instance, economic benefits could be derived from non-wood forest products and services that forests can provide, although several bottlenecks need to be solved to have these values recognized.

At the sixth Mediterranean Forest Week held in Brummana, Lebanon, in April 2019, young Mediterranean professionals in the fields of forestry and environment made a vibrant call for more forest-related job opportunities to tackle environmental challenges that they will have to face in a changing global environment. Young people in the age range between 15-24 years represent 14% of the Mediterranean population, a rate that is trending upwards. The proportion



of youth that is not in education, employment or training ranges between 7 and 33% depending on the country and there are significant disparities between sub-regions and according to gender.

Building a bridge between the forest and the labor force of young Mediterranean people can make a difference and give value to the goods and services provided by forests, while implementing forest-based solutions. Improving the social perception of forestry, directing forest management towards participatory approaches and co-management, better communicating on forestry, and aligning forestry education and training with current challenges are key activities in this regard. Furthermore, in order to bridge the afore-mentioned gap, one must open the circle and add components like cities, crops, watersheds, and all those components, which are not part of the forest but interact and interdepend with forests at the landscape level.

These were the motivations leading to the themes and topics addressed by the 7th Mediterranean Forest Week: “Forest and ecosystem restoration for the next Mediterranean generations”. The Week will explore the opportunities offered by Mediterranean forests and challenges related to ecosystem restoration to provide jobs and opportunities to young people while facing the forest threats raised by global changes.

The objectives of the Seventh Mediterranean Forest Week are the following:

- Identify opportunities offered to young people by forest-based solutions in the Mediterranean and anticipate possible bottlenecks so that these opportunities become necessities
- Capitalize on successful experiences combining innovative forest management and local populations – particularly the youth – and share this experience among countries for possible replication
- Promote landscape approaches for Mediterranean forest, with focus on restoration and conservation of biodiversity, to open the forest more widely to populations and neighboring sectors (e.g. cities);
- Mobilize all stakeholders involved in the integrated management of Mediterranean forests to facilitate the integration of young people into forest-based solutions;
- Build a common vision of the role of young people in the sustainable management of Mediterranean forests in a changing world.

Context of the thematic session organized by EEA and ETC-UMA

Spatial information and resulting maps are essential tool for knowing the territory, planning, and prioritizing actions. In the case of forest maps, they support decision making and management of forest resources in the region which ensures improved governance systems, informed decisions for restoration prioritization, for instance.

Obtaining an accurate map requires a major effort. Traditionally, land cover maps have been done photo-interpreting aerial photographs and complementing with field data. However, these maps are expensive to produce, and the process takes several years. In the best-case scenario, field inventories and land cover maps take five to ten years to be updated. In the latest years, satellite data and automatic classification techniques have been used to reduce time of production and



human manpower. Today, there are some reference forest maps at global scale; however, the precision of these maps is different than the traditional ones, plus they only provide generic forest classes, such as distribution of coniferous and broadleaved forests, or dense and open forests.

At the Mediterranean level, the European Topic Centre on Spatial Analysis and Synthesis (ETC-UMA), the Department of Supercomputation and Bioinformatics at University of Malaga (Khaos), the MEDFORVAL network, the European Environment Agency, and *Silva Mediterranea* are working collaboratively on developing an enhanced forest map based on dominant tree species in the Mediterranean, by means of satellite data and artificial intelligence. Among others, this map will distinguish main groups of relevant Mediterranean forests, such as several species of oaks and pines, junipers, chestnut, beech, firs, riparian forests, and other emblematic forest types in the Mediterranean, such as cedars and Spanish fir. Moreover, the method developed will allow yearly updates of the map.

This map will support the implementation of international targets (Sustainable development Goals –SDG–; Convention on Biological Diversity –CBD–; United Nations Framework Convention on Climate Change –UNFCCC–, among others) by sharing new knowledge, improving understanding of science, and providing innovative solutions to identifying and quantifying potential restoration sites.

The aim of this collaboration is to produce a Mediterranean wide forest map as a regional baseline with comparable information and similar accuracy across all countries that uses a methodology that is replicable allowing regular updates. Such a regional product allows monitoring changes in Mediterranean forests, across time, independently of the existence/accessibility or not of national inventories and databases. The approach uses open-source satellite data from the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) that covers the region with images with the same quality and periodicity across the area. Furthermore, the analysis of the images uses machine learning tools enabling processes automation.

National and supra-national space institutions are facilitating open access data for environmental monitoring, promoting the use of cost-effective digital tools and AI shared among young researchers and public authorities. The investment in these technologies and capacity building opportunities for youth will help facilitate a regional understanding and assist in the identification of important areas (for restoration and spatial planning) while linking the potential development of forest-related economic activities among youth. Moreover, it will support the regular monitoring activities which could help to check effectiveness of measures taken. The tools used are avant-garde technology and science, opening opportunities for green jobs, specifically for young people, in line with the EU Green Deal and Ecological Transition.

The resulting forest maps will provide very valuable information for different stakeholders, including decision makers, forest managers, land developers and researchers from all Mediterranean countries and will promote green businesses among youth and raise awareness on forests among the wider public. They align with the EU Forest Strategy, the reports on State of Mediterranean Forests (2013 and 2018), the Agadir Declaration, the Brumana Declaration and



FAO's Strategic Framework on Mediterranean Forests, as the monitoring of forest along the time reveals trends and impacts in forests, such as degradation, desertification, and occurrence of fires, while also evaluate the success of good management practices, such as restoration and conservation.

The landscape overview of a regional map provides insights in understanding the ecological and economical dynamics that affect forests, such as the distribution of land cover classes and land cover changes along the time. Understanding the state of our forests and the landscape context is the first step to design good restoration plans and prioritize which zones to restore and protect.

In the development of the forest map, researchers and institutions of several countries along the Mediterranean are involved to collect local and national forest data to feed our machine learning models and validate our results. As a side product, a specific database of Mediterranean forest types is generated. As a result of these interactions, a debate arose about what is a forest and what kind of basic / essential information, building on expert rules, must be in a map to help the different stakeholders who might use it.

Objectives of the thematic session organized by EEA and ETC-UMA

Different audiences will be engaged in a conversation about the importance of having accurate and timely information about forests to take informed decisions and action plans on forest management and related policies.

The development of this regional map fills an important gap in territorial tools and allows to have a comparable Mediterranean wide product that can be used to complement countries with lack of data on forests and / or to foster supporting transboundary initiatives by allowing a comparable baseline for their work.

A map provides a landscape overview of land planning and dynamics, enabling to make connections between the impacts on forests and the drivers of those impacts. Also, the quantification of different forest types and their density is the primary step in the estimation of carbon sequestration and environmental services in the Mediterranean, as well as prioritizing forest areas for restoration and ecological corridors to ensure connectivity.

Also, there is a need to know what type of information should appear in the map; how forests should be defined in this map to make it useful for a larger number of people. Shall the forests be defined by the dominant species? By species associations? How far can be reached if a map based on satellite data is created?

This session will also be the opportunity to have a conversation about the job opportunities that this work triggers. Open-source data and technology enables young people to create their own job initiatives on a green line, as big data analysis is a low impact and sustainable activity. Moreover, the most innovative machine learning and artificial intelligence techniques are used to produce the map.



Detailed agenda of the thematic session

Moderator : Nelly Bourlion, ETC-UMA

Rapporteur : Annemarie Bastrup-Birk, EEA

Time	Content	Speaker
10 min	Contributing Mediterranean regional partnerships on forests	Cécile Roddier-Quefelec and Annemarie Bastrup-Birk– <i>The European Environment Agency</i>
15 min	Supporting forest conservation and restoration policies - A Mediterranean wide forest map	Virginia Garcia – <i>ETC-UMA</i>
10 min of Q/A		
15 min	Current forest inventories in the Mediterranean	Issam Touhami – <i>Tunisian Research Institute for Rural Engineering, Water and Forests (INRGREF)</i>
10 min	Transboundary collaborations for forests – The MedForVal network	Alessio Martinoli – <i>Institute Oikos</i>
10 min	Local forest management efforts – the Shouf Biosphere Reserve	Nizar Hani – <i>The Shouf Biosphere Reserve</i>
15 min of Q/A		
5 min	Summary and next steps	Annemarie Bastrup-Birk– <i>The European Environment Agency</i>