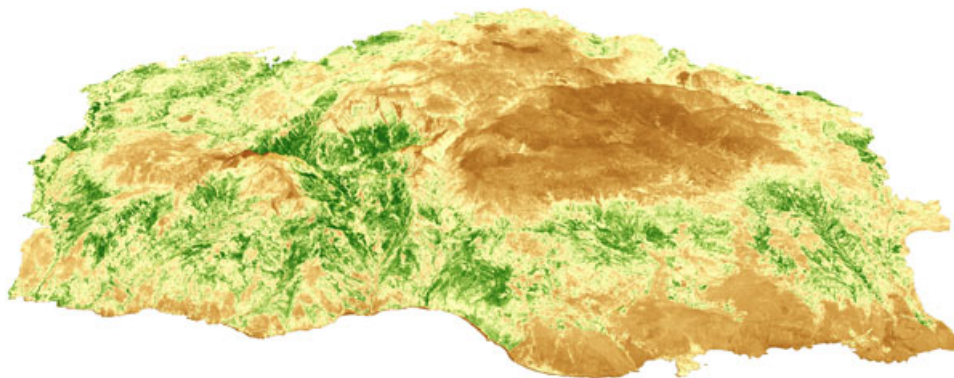


2020: Aligning biodiversity with climate action – Perspective of the European Space Agency

The European Space Agency has been offering high quality earth observation data to scientists and public authorities for over 40 years. These earth observation data have assisted them in monitoring the earth's environment and security, and develop innovative applications that better support policies. Especially in light of the climate change crisis, unbiased, high quality data such as those from earth observation satellites have been instrumental in monitoring the implementation of policies and the state of our environment and climate over the past decades.

In partnership with the European Union, ESA therefore developed the Copernicus programme, which monitors the environment and security in Europe and globally. The Copernicus programme became operational in 2014 with the launch of its first satellites – Sentinel-1, providing a radar view of the world, Sentinel-2 for high resolution optical land monitoring, Sentinel-3 for global measurements of oceans and land, and Sentinel-5P, which gives unprecedented information on global air quality. These satellites feed the 6 Copernicus services, which provide information and forecasts relevant to EU and national policies . All these data are distributed under a free, full and open data policy. To date, over 300,000 users have registered to access these data and information, resulting in societal and economic benefits that far exceed the initial expectations. The excellent performance and quality of the data and information provided by Copernicus are recognised on a global level.

For biodiversity, satellite data from the Copernicus programme, and from past ESA satellites have enabled the development of relevant indicators and monitoring processes. Biodiversity plays an important role in sustaining the world's population. It supports food security, energy provision and medicine. Biodiversity is also key to creating a stable climate, as thriving ecosystems can help mitigate the effects of climate change. Land use change heavily impacts biodiversity, and is one of the key parameters that can be measured from space. In Crete for example, scientists have used Copernicus Sentinel-1 data to derive factors such as slope and elevation, while Sentinel-2 data were transformed into land use change and vegetation growth parameters. These derived parameters can serve as indicators for the presence of endemic lizards in the Samaria National Park in Crete.



Calculated using Copernicus Sentinel-2 timeseries, this 3D view of the Samaria Park in Greece is overlaid with an annual mean Normalised Difference Vegetation Index for the year 2017. The greener areas represent areas of richer vegetation. Contains modified Copernicus Sentinel data (2017) /processed by Dimitris Poursanidis/FORTH

In addition, Sentinel-2 data has helped the park managers of the Samaria National Park to monitor illegal activities such as logging and fires, thereby helping to preserve the ecosystem.

A strong biodiversity also positively influences other domains, such as tourism. UNESCO and ESA performed a project in the Virunga National Park in Central Africa, creating high quality maps of the territory to combat illegal deforestation and poaching. The maps and geospatial products created help preserve the Virunga National Park as a World Heritage site, as an ecosystem that sustains the last mountain gorillas, and many other species in the region. Satellite-based earth observation provided the means to efficiently, cost-effective and frequently monitor the areas under pressure. This is especially of importance in large, unmapped areas which are difficult to penetrate to do fieldwork.



Satellite image highlighting land cover change in Virunga National Park (ESA)

President Ursula von der Leyen clearly stated her ambitions to make Europe a global leader in climate change, supported by a strong economy and new technologies. In particular, the European Green Deal plans to transition the EU to a carbon neutral economy and to make the EU a frontrunner in knowledge, technology and best practices for a healthy environment and a thriving economy around it.

The European Green Deal and the 2015 Paris Agreement are also shifting biodiversity monitoring to higher gears. To match the new ambitions of the European Green Deal, the European Space Agency, in partnership with the European Commission, proposes 6 novel earth observation satellite missions. These missions will form part of the Copernicus element of the EU Space programme from 2021 onwards. One of these missions in particular, the hyperspectral mission CHIME, will be able to contribute to a larger set of biodiversity indicators from space. These include variables on species populations (distribution and abundance), community composition, ecosystem productivity and carbon stock, extent and functional type, amongst others.

To ensure that high quality data and novel observations, remain available and accessible to users in Europe and beyond, the Copernicus programme requires a budget that signals the importance of these data. The Copernicus programme is co-funded by the European Commission and the European Space Agency. A pledge of €1.4 billion was made with ESA members states at the ministerial conference in November 2019.

Within the EU MFF 2021-2027, a budget of approximately €6 billion is proposed for Copernicus in the EU space programme, which will be negotiated further this year. ESA estimates that the budget required for the improved continuation of measurements and the expansion with new sensors of the current Space Component with the six new High Priority Candidate Missions will be around €8 billion.

If the European Union wants to step up its effort towards climate neutrality and biodiversity, then it must increase its monitoring capacity, and additional funding will be required to fully meet the requirements of the new Commission's priorities.