



Mapping and Assessment of Ecosystems and their Services in the European Union (MAES)

- Europe's 'natural capital' is essential to human life and well-being. It is vital to protect it!
- Natural resources are not infinite, and we need to manage them sustainably. But to manage them we first need to measure.
- The MAES initiative (Mapping and Assessment of Ecosystems and their Services) is an essential part of the EU Biodiversity Strategy to 2020 and crucial in ensuring that ecosystems and their services can play a key role in planning and development processes and decisions.
- Under the MAES initiative, EU Member States are committed to improve the knowledge and evidence base of Europe's natural asset, with support from the European Commission and the European Environment Agency.
- This information will enable governments, and the EU itself, to prioritise political actions and take the right decisions to safeguard Europe's natural capital.

1. Facing the threat to ecosystems

Nature provides multiple services that make human life possible. These include the provision of food, fresh water and clean air, fuel, shelter and medicine, plant pollination, and mechanisms to regulate the climate.

Ecosystems are dynamic systems of plants, animals, and micro-organism communities which, together with their non-living environment, interact as functional units. Biodiversity forms the living part and is essential to ensure the long-term delivery of a wide range of benefits for human well-being.

But these natural resources – our natural capital – are under threat: e.g. grassland butterfly populations, which contribute to pollination, have declined by over 70% since 1990. The EU is committed to halt the loss of biodiversity and restore at least 15% of degraded ecosystems by 2020.

2. Putting a price on the priceless

Globally, ecosystems supply services worth trillions of euro, as the 2010 TEEB (The Economics of Ecosystems and Biodiversity) study demonstrated. As an example, insect pollination in the EU alone is worth an estimated € 15 billion per year. But these services cannot be measured only in monetary terms. One essential aspect of MAES is that it looks at the overall, long-term benefits for human well-being of maintaining healthy biodiversity

and resilient ecosystems. This is a key component of the MAES analytical framework developed in April 2013 by the EU and its Member States.

3. Why mapping and assessment is crucial

Comprehensive and reliable information about the status of biodiversity, ecosystems and ecosystem services, and the capacity to monitor change, is essential to know what the situation is now and what it would be in 2020, and to assess whether biodiversity targets have been reached and the right policy decisions have been taken.

Mapping and assessment is also needed to underpin the implementation of environmental legislation, integration of biodiversity objectives into sectoral policies, and the development of sustainable agriculture, forestry and fishing.

4. Member States in the lead, with EU support

Member States are committed to map and assess the state of ecosystems and services on their territories. The Commission and the European Environment Agency (EEA) are giving support through the development of methodological frameworks, modelling and mapping tools, indicators, etc.

The EU assessment will guide decisions on complex public issues such as: Are Europe's ecosystems healthy enough to continue to deliver essential services? Can we value individual services and their contribution to society? What action is needed to improve the situation?

MAES' role across the environment





Step 1 – agreeing a framework

The Commission, in consultation with experts and stakeholders, has published a coherent **analytical framework** to ensure the EU and Member States adopt a harmonised approach.

According to the UN Food and Agriculture Organisation, 60% of the world's ecosystems are degraded or used unsustainably; 75% of fish stocks are over-exploited or significantly depleted; 75% of the genetic diversity of agricultural crops has been lost since 1990; and an estimated 13 million hectares of tropical forests are cleared each year.

This work also contributes to the conceptual framework for global assessments under the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). It identifies 12 ecosystem types that combine land-cover classes and habitat classification systems within three main categories:

- Terrestrial: urban, cropland, grassland, woodland and forest, heathland and shrub, sparsely vegetated land, wetlands.
- Freshwater: rivers and lakes.
- Marine: marine inlets and transitional waters, coastal, shelf, open ocean.

The Common International Classification of Ecosystem Services (CICES), used for accounting, is proposed for the classification of ecosystem services with clear links to the Millennium Ecosystem Assessment (MA) and TEEB typologies.

Step 2 – testing the water

The MAES' second technical report, published in 2014, proposes indicators that can be used at European and Member State level to map and assess biodiversity, ecosystem condition and services, based on the outcomes of six thematic pilot studies on agriculture, forests, freshwater, marine environment, conservation status, and natural capital accounting.

The MAES model uses a four-step approach to each ecosystem: mapping, assessment, measuring of services, and compilation of data into an integrated ecosystem assessment.

5. Synergy with EU legislation and policy

Data flows from reporting procedures under EU environmental legislation are feeding into MAES, including the Birds and Habitats Directives, the Water Framework Directive, and the Marine Strategy Framework Directive.

MAES helps support EU and national policy-making on farming, forestry, renewable energy, maritime affairs and fisheries, regional planning, climate change and cohesion. Wider knowledge will be of great value in climate adaptation (using ecosystem-based approaches for flood protection and forest fire prevention), regional policy (as a tool in urban planning and deployment of green infrastructure), water policy (providing multiple ecosystem services from lakes and rivers, such as water supply, angling, tourism and nature conservation), coastal protection, and in many other areas.

6. To the future

The 2014 MAES delivery is just a first step. The results of MAES will feed into the Mid-Term Review of the EU 2020 Biodiversity Strategy in 2015, and work will continue so as to draw up, by 2020, a comprehensive benchmark of the condition of EU ecosystems and the value of the services they deliver.

Key recommendations

- Go green! Many indicators are available for immediate application. These indicators received a green colour in the MAES report.
- Prioritize! When certain services are supplied by many ecosystems, it saves time to map and assess those services across all ecosystems instead of making maps per service and per ecosystem
- Avoid double counting: The CICES classification system for ecosystem services is hierarchical in structure so that indicators can be used at different levels. This may help avoid double counting.

EU 2020 Biodiversity Strategy

The EU is committed to halting the loss of biodiversity and the degradation of ecosystem services in Europe by 2020.

In 2010, Union leaders agreed ambitious target and vision:

2050 vision

By 2050, European Union biodiversity and the ecosystem services it provides — its natural capital — are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.

2020 headline target

Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.

The Commission's EU 2020 Biodiversity Strategy includes six targets and 20 actions. Target 2, Action 5 lays the foundations for MAES, highlighting the need for reliable and consistent information about biodiversity across the EU.

EU 2020 Biodiversity Strategy, Target 2, Action 5

Member States, with the assistance of the Commission, will map and assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020.

Case studies

Spain

The use of ecosystem service maps for conservation planning is increasing. Their potential for measuring the benefits derived from protected areas was assessed for Doñana and Sierra Nevada protected areas. From this study, it appeared that most problems originated outside the limits of the protected areas and were produced by drivers associated with economic factors and land-use changes. The results of the study demonstrate the need for a broader territorial planning strategy.

Flanders (Belgium)

The mapping of ecosystem services in Flanders supports decisions on trade-offs in land-use planning between allocating land to provisioning services (food, timber, water), regulating services (air, water, soil quality regulation, climate regulation, erosion protection etc.) and cultural services (recreation and information for education and art, etc.). Interestingly, the green areas of cities provide all sorts of services, which score high marks in terms of social benefits.

Wales (UK)

Combining maps of ecosystems and ecosystem services, both potential and actual, provided information on which areas, and which ecosystems (habitats) in Wales contribute to UK national climate targets, and at the same time to local social benefits through amenities and landscapes.

Further information

DG Environment website: http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/index_en.htm

MAES website: <http://biodiversity.europa.eu/maes>

MAES: An analytical framework for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020, April 2013: http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/MAESWorkingPaper2013.pdf

MAES: Indicators for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020, February 2014: http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/2ndMAESWorkingPaper.pdf

