



MAIA
Mapping and Assessment for
Integrated ecosystem Accounting

MAIA webinar 11.01.2021

**Spatial modelling for compiling Ecosystem Services
biophysical accounts**

How to find the right method for compiling biophysical ecosystem services accounting - the **ESMERALDA MAES Methods Explorer**

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817527

ESMERALDA MAES Methods Explorer



Enhancing ecosystem services mapping
for policy and decision making

<http://www.esmeralda-project.eu/>

- ★ **EU Horizon 2020 Coordination and Support Action**
- ★ Support for EU member states in the implementation of MAES (**M**apping and **A**ssessment of **E**cosystems and their **S**ervices in the context of the EU Biodiversity Strategies 2020 and 2030)
- ★ Project duration: 01.02.2015 - 31.07.2018
- ★ 37 Project partners in all 28+3 EU member states
- ★ aimed at identifying and testing ES mapping methods and to provide guidance on their application for various purposes

ESMERALDA MAES Methods Explorer

★ ESMERALDA MAES Explorer

<http://www.maes-explorer.eu>

The screenshot shows the ESMERALDA MAES Explorer website. At the top, there is a dark blue navigation bar with links for Home, Full Report, About Esmeralda, and Contact us, followed by a search bar and a progress indicator with numbers 1 through 7. Below the navigation bar is a large banner featuring a map of Europe with the word "ESMERALDA" in large white letters and two stars on either side. The main content area has a white background and contains the following text:

Welcome to the Guidance on Ecosystem Service Mapping and Assessment by ESMERALDA, a support and coordination action funded under the Horizon 2020 programme for research and innovation of the European Commission.

This website provides guidance which explains the process of how to map and assess ecosystem services as required by Action 5 of the [EU Biodiversity Strategy to 2020](#). Action 5 foresees that the European Commission helps countries set up a knowledge base on ecosystems and ecosystem services and to use this knowledge in policy and decision-making at different levels of governance.

ESMERALDA worked closely together with the working group [MAES](#) on Mapping and Assessment of Ecosystems and their Services to develop guidance which is tailored to the member states of the EU.

Start exploring the guidance by clicking on one of the entry points below:

Questions and Themes

Below this heading are seven circular icons, each with a number from 1 to 7 inside a small circle at the top. Each icon is accompanied by a text description:

- 1. What kind of questions do stakeholders have?
- 2. Identification of relevant stakeholders
- 3. Network creation and involvement of stakeholders
- 4. Mapping and assessment process
- 5. MAES case study applications
- 6. Dissemination and communication
- 7. Implementaion

At the bottom of this section is a blue button with the text "Download PDF of full report".

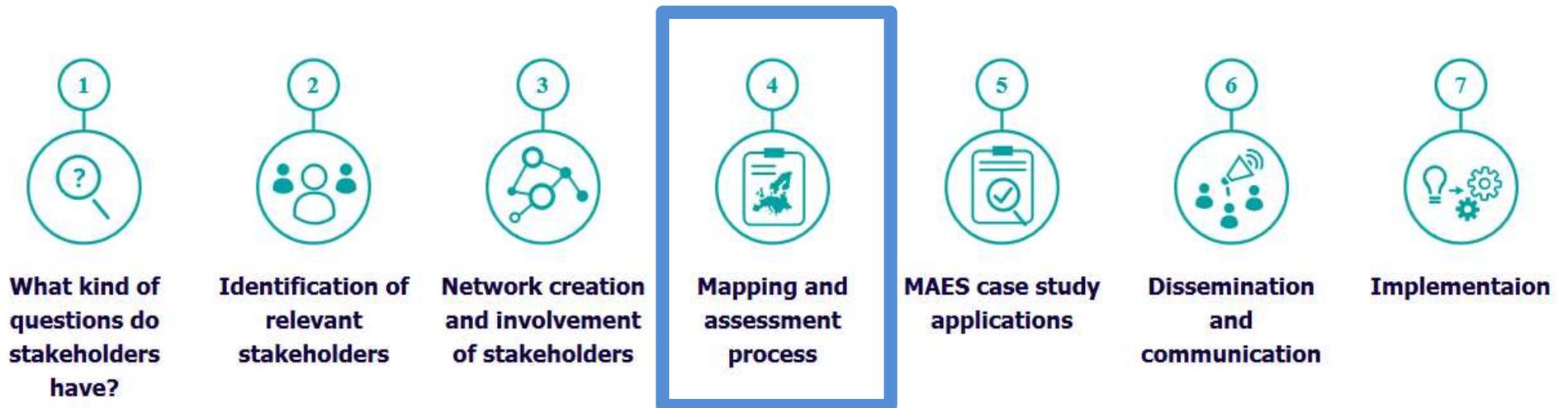
The footer of the website is dark blue and contains the text "Follow ESMERALDA" followed by social media icons for Twitter, Facebook, and LinkedIn.

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- ★ You can browse along the whole MAES process to find what you need to implement MAES in your country, region or case study

<http://www.maes-explorer.eu>

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Mapping and assessment process

The ecosystem services mapping and assessment process is the technical/methodological core of MAES. Mapping refers, in this context, to the spatial delineation of ecosystems as well as their condition and the services they supply through the spatial integration of a wide range of methods and data sets. Assessment includes the analysis and review of (existing) information derived from research for the purpose of helping someone in a position of responsibility to evaluate possible actions or think about a problem. In ESMERALDA, the focus was on ecosystem services mapping and assessment, less on ecosystem types, condition or accounting, the other relevant parts for MAES.

ESMERALDA developed a 'flexible methodology' for ecosystem services mapping and assessment providing the building blocks for regional, national and pan-European assessments. This methodology has been built on existing research, related projects, methods and databases. The results of the comprehensive ESMERALDA review of existing studies can be explored by the MAES methods Explorer, a searchable online database as well as the detailed Methods Documentations of biophysical, economic and social methods and possible Methods Integration. Finally, ESMERALDA is providing a useful overview of selected Methods' Applications and links to the ESP Visualisation tool, an online platform where ecosystem service maps can be shared.



<http://www.maes-explorer.eu>

ESMERALDA MAES Methods Explorer



★ ESMERALDA MAES Explorer



ESMERALDA MAES methods Explorer

Database: Identifying and recording the relevant and correct method for ecosystem services mapping and assessment is not trivial. Therefore, one of the aims of ESMERALDA was to create a database of existing studies on mapping and assessing ecosystems and their services and highlight several attributes to the ecosystem as well as the methods, scale, ecosystem type, ecosystem service categories etc. This database forms the basis for the **MAES methods Explorer**. Currently the database consists of 883 entries describing case studies where ecosystem service-relevant methods have been described in their context. Further examples can be entered via the online questionnaire at:

<https://www.webpolsurveys.com/S/85E71B9D58A30304.par>

[MAES Methods Explorer](#)

The [Online Tool](#) provides a simple yet powerful interface for searching the database. The user can search for examples or methods by filtering the dataset by various attributes - such as ecosystem service, ecosystem type, policy question covered etc. From here the user will be linked to further information. The tool offers multiple entry points into the dataset to make it easier for first time users to explore the dataset in meaningful ways by providing preconfigured filters. For example to every case study booklet there has is a filter to select similar items to the topics covered in the case study booklet. Find more information to the case study booklets and other entry points:

<http://www.maes-explorer.eu>

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Welcome to the MAES Methods Explorer

On this website you can explore the ESMERALDA methods database. The Purpose of this database is to collect the majority of available methods to map and assess ecosystem services. Its aim is also to link those methods to specific ecosystem types as well as ecosystem services.

ESMERALDA

Methods & Case Studies

Learn more about the methods and explore our case study booklets.



explore methods & case studies



Search ESMERALDA database

Search the ESMERALDA database for case study literature and methods.

search database

Policy & business questions

Use policy or business question as a starting point to explore the database.



explore business / policy questions

Tiers

Use "tiers" as starting point to explore our database.



explore tiers

<http://www.maes-explorer.eu>



ESMERALDA MAES Methods Explorer



[back to home page](#)

ESMERALDA DATABASE

Here you can search the ESMERALDA database. There are two result types you can search for: Methods or Literature. On the left side you can adjust the search filters. A quick filter that searches in the title is always available. You can add more filters by clicking on the "add filter" button. When searching for methods, opening a method will show you literature items that used it in the context that is described by the search filters. When searching for literature the result will show you literature and in the details methods they used according to the chosen filters.

database

search filters

Literature Methods quick filter

[add filter](#)

search results 42 item(s) found

Choice modelling (choice experiment, discrete choice modelling) (Economic)	>
Conceptual model (Biophysical)	>
Contingent valuation (Economic)	>
Corporate Ecosystem Service Review (Economic)	>
Cost-Benefit Analysis (CBA) (Economic)	>
Cost-Effectiveness Analysis (CEA) (Economic)	>
Damage cost avoided (Economic)	>
Defensive expenditure (Economic)	>
Deliberative assessment (Socio-cultural)	>
Ecological Connectivity models (to include methods/software such as Zonation, MSPA, MatrixGreen, TerrSet (former IDRISI), FunCon, etc.) (Biophysical)	>

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ESMERALDA MAES Methods Explorer



database

search filters

Literature Methods quick filter

add filter ▾

- Dimension
- Country
- Ecosystem type
- Abiotic ecosystem service class
- Biotic ecosystem service class
- Policy Domain
- Policy Objective
- Business Objective
- Scale of mapping / assessment
- Tier applied

search results 44 item(s) found

Choice modelling (choice experiment, discrete choice modelling) (Economic)	>
Conceptual model (Biophysical)	>
Contingent valuation (Economic)	>
System Service Review (Economic)	>
Analysis (CBA) (Economic)	>
ness Analysis (CEA) (Economic)	>
: avoided (Economic)	>
penditure (Economic)	>
assessment (Socio-cultural)	>
connectivity models (to include methods/softwares such as Zonation, MSPA, MatrixGreen, TerrSet (former IDRISI), FunCon, etc.)	>
vice Accounting (Economic)	>
Ecosystem service assessment (Economic)	>
Field Observations (Biophysical)	>
Geo-tagged photo-series analysis (Socio-cultural)	>
Group / participatory valuation (Economic)	>
Hedonic pricing (Economic)	>

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ESMERALDA MAES Methods Explorer



database

search filters

Literature Methods quick filter

Dimensions match any **↔** every | select all **↔** none | remove filter

use dropdown to select Dimensions ▾

🗑 Biophysical

Tier applied match any **↔** every | select all **↔** none | remove filter

use dropdown to select Tier applied ▾

🗑 Tier 3

add filter ▾

search results 11 item(s) found

- Conceptual model (Biophysical) >
- Field Observations (Biophysical) >
- Integrated modelling framework (Biophysical) >
- Phenomenological models (Biophysical) >
- Process-based models (includes: landscape function models) (Biophysical) >
- Spatial proxy methods (Biophysical) >
- State and transition model (Biophysical) >
- Statistical models (Biophysical) >
- Surveys and questionnaires (Biophysical) >
- Trait-based models (Biophysical) >
- Use of statistical and socio-economic data (Biophysical) >

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ESMERALDA MAES Methods Explorer



search filters

Literature Methods quick filter

Dimensions match any **↔** every | select all **↔** none | remove filter

use dropdown to select Dimensions ▾

Biophysical

Ecosystem types match any **↔** every | select all **↔** none | remove filter

use dropdown to select Ecosystem types ▾

Grassland

Biotic Ecosystem Service Classes match any **↔** every | select all **↔** none | remove filter

use dropdown to select Biotic Ecosystem Service Classes ▾

Pollination and seed dispersal

Scale of Mapping / Assessment match any **↔** every | select all **↔** none | remove filter

use dropdown to select Scale of Mapping / Assessment ▾

Local

Tier applied match any **↔** every | select all **↔** none | remove filter

use dropdown to select Tier applied ▾

Tier 3

add filter ▾

search results 2 item(s) found

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Spatial proxy methods (Biophysical)

<http://www.maes-explorer.eu>

ESMERALDA MAES Methods Explorer



search filters

Literature Methods quick filter

Dimensions match any every | select all none | remove filter
use dropdown to select Dimensions
Biophysical

Ecosystem types match any every | select all none | remove filter
use dropdown to select Ecosystem types
Grassland

Biotic Ecosystem Service Classes match any every | select all none | remove filter
use dropdown to select Biotic Ecosystem Service Classes
Pollination and seed dispersal

Scale of Mapping / Assessment match any every | select all none | remove filter
use dropdown to select Scale of Mapping / Assessment
Local

Tier applied match any every | select all none | remove filter
use dropdown to select Tier applied
Tier 3

add filter

search results 2 item(s) found

Field Observations (Biophysical)

Spatial proxy methods (Biophysical)

Spatial proxy methods are derived from indirect measurements which deliver a biophysical value in physical units but this value needs further interpretation, certain assumptions or data processing, or it needs to be combined in a model with other sources of environmental information before it can be used to measure an ecosystem service. In many cases, variables that are collected through remote sensing qualify as indirect measurement. Examples for terrestrial ecosystems are land surface temperature, NDVI, land cover, water layers, leaf area index and primary production.

this method is used by

Modelling land assessment of ecosystem functions and services in the Netherlands - Peter Keesen-Godshuis, A. B. F. (2013)

Landscapes with wild bee habitats enhance pollination, fruit set and yield of sweet cherry - Holzschuh, A. et al. (2012)

<http://www.maes-explorer.eu>

ESMERALDA MAES Methods Explorer



search filters

Literature Methods quick filter

Dimensions match any | every | select all | none | remove filter

use dropdown to select Dimensions

Biophysical

Ecosystem types match any | every | select all | none | remove filter

use dropdown to select Ecosystem types

Grassland

Biotic Ecosystem Service Classes match any | every | select all | none | remove filter

use dropdown to select Biotic Ecosystem Service Classes

Pollination and seed dispersal

Scale of Mapping / Assessment match any | every | select all | none | remove filter

use dropdown to select Scale of Mapping / Assessment

Local

Tier applied match any | every | select all | none | remove filter

use dropdown to select Tier applied

Tier 3

add filter

search results 2 item(s) found

this method is used by

Modelling land management effect on ecosystem functions and services: a study in the Netherlands - Petz, K. and van Oudenhoven, A. P. E. (2012) >

Landscapes with wild bee habitats enhance pollination, fruit set and yield of sweet cherry - Holzschuh, A. et al. (2012) v

URL:
<https://doi.org/10.1016/j.biocon.2012.04.032>

Country:
DE

Scale of mapping / assessment:
Local

Detailed location:
The study was conducted in the region around the town of Witzenhausen, Northern Hesse, Germany (51°20'23"N, 9°51'20"E). This region is characterized by relatively heterogeneous landscapes

Purpose of the study:
Indicator development, Awareness Raising

Abiotic ecosystem services:
none

Biotic ecosystem services (provisioning):
Cultivated crops

Biotic ecosystem service (regulating)
Pollination and seed dispersal

Ecosystem type
Cropland, Grassland, Woodland and forest, Other, specify

Tier applied
Tier 2, Tier 3

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Publications on content creation (Santos-Martin et al. 2018) and on technical implementation (Reichel & Klug 2018)

<https://oneecosystem.pensoft.net/article/26719>

One Ecosystem Ecology and Sustainability Data Journal

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Research Article One Ecosystem 3: e26719 <https://doi.org/10.3897/oneeco.3.e26719> (12 Jul 2018)

Creating an operational database for Ecosystems Services Mapping and Assessment Methods

▼ Fernando Santos-Martin, Arto Viinikka, Laura Mononen, Luke M Brander, Petteri Vihervaara, Inge Liekens, Marion Potschin-Young

Abstract ▲

Identifying and applying the appropriate method for ecosystem services mapping and assessment is not trivial. To provide guidance in this task, this paper describes the creation of a database for existing studies on mapping and assessing ecosystems and their services, which records relevant information to the ecosystem studies (e.g. methods used, the scale, ecosystem type, ecosystem service categories) and other relevant attributes that need to be considered. This database, therefore, forms the basis for an online ecosystem service 'methods finder'. Our results provide an overview of the database itself (883 entries until April 2018) and the consultation within the ESMEALDA consortium that shaped its development, as well as providing an overview of the final mapping and assessment methods describing their spatial distribution. This work helps identify the main gaps and opportunities for alignment and development of commonalities in analytical approach amongst the individual Member States. The results illustrate the different conditions, dimensions and geographical contexts in Europe, information that can be used as background to help the development of a flexible methodology for mapping and assessing ecosystem services in Europe. The paper

<https://oneecosystem.pensoft.net/article/25542>

One Ecosystem Ecology and Sustainability Data Journal

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Software Description One Ecosystem 3: e25542 <https://doi.org/10.3897/oneeco.3.e25542> (15 Oct 2018)

An online method database for mapping and assessing ecosystem services

▼ Steffen Reichel, Hermann Klug

Abstract ▲

Background

Since the foundation of the ecosystem services concept in the ninetieth of the last century (Costanza et al. 1998, Costanza et al. 1997, de Groot 1992), many methods to map and assess ecosystem services have been developed and applied to policy and business questions worldwide. While many flexible methods exist at different spatial scales and ecosystem types, Jax et al. (2018) express the difficulty in choosing and applying the correct method to the right topic of interest. To enable a selection of appropriate methods, Harrison et al. (2018) developed a decision tree approach. However, Dunford et al. (2018) argue that often not a single method but a combination of methods are required for appropriate decision-making in real world situations. Thus, applying the concept of ecosystem services in practice is challenging, especially at institutional level (Saarikoski et al. 2018). This hampers comparability, applicability and transferability of ecosystem services assessments and related mapping applications across scales and European regions. It also impedes a solid overview of existing methods suitable for use at different scales in different biomes and types of ecosystems. These challenges require a consistent knowledge capitalisation infrastructure, where

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Conclusions

- The database behind the ESMERALDA MAES Methods Explorer was initially filled with **883 entries** until April 2018
- Additional entries with focus on MAES in the **EU's Outermost Regions** and **Overseas Countries & Territories** were added in the course of the EU projects MOVE and MOVE-ON
- The ESMERALDA MAES Explorer (with the MAES Methods Explorer) will be hosted by the Ecosystem Services Partnership ESP in the future (transfer is currently going on)
- **Further entries** and updates on respective ES assessment methods and related applications are welcome, especially with regard to methods of **ES accounting**



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Thanks a lot for your attention!

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Mapping & Assessment for Integrated ecosystem Accounting
<http://maiaportal.eu/>

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