Ecosystem accounts - measuring the contribution of nature to the economy and human wellbeing

Statistics Explained

Highlights

Do you wonder how nature and its various ecosystems contribute to the wellbeing of society and the economy? Would you like to know how these benefits can actually be captured and presented in a statistical system? Over the past few years, many different actors such as the European Commission including Eurostat, the United Nations, national statistical offices and the research community have been working together to shed some light on these questions. Initial results for the EU were published in June 2021 in the report Accounting for ecosystems and their services in the European Union (INCA) .

This article provides an overview of work on ecosystem accounts at EU-level and in a number of European countries. The last section highlights the policy context of ecosystem accounts and their uses for policy-making.

Introduction to ecosystem and ecosystem services accounting

Ecosystem accounting is a statistical framework for organising data, tracking changes in the extent and the condition of ecosystems, measuring ecosystem services and linking this information to economic and other human activity. It aims to illustrate the benefits society receives from ecosystems and their services.

More concretely, ecosystem accounts can answer questions such as:

- What is the extent of wetlands at country or at EU-level? How have their extent and condition changed over time?
- How is the condition of farmland soil changing? How much carbon does it retain? How much agricultural soil is lost due to urbanisation, and in particular where do these losses take place?
- Where and by which sector are ecosystem services, such as water purification used? Where is investment in water purification measures needed?
- What is the value of nature-based recreation in the EU? How has it changed over time?

The international System of Environmental-Economic Accounting

The System of Environmental Economic Accounting (SEEA) is an internationally agreed statistical system that brings together environmental and economic information into one common framework. It comprises several areas of interest covered by different SEEA handbooks, including:

- the SEEA Central Framework (SEEA CF)
- the SEEA Ecosystem Accounting (SEEA EA)
- the SEEA Applications and Extensions

The SEEA EA (SEEA Ecosystem Accounting) provides conceptual guidance for developing ecosystem extent, ecosystem condition and ecosystem services accounts. It complements the SEEA CF by moving beyond the assessment of individual environmental resources (e.g. 'land' or 'forest') to an ecosystem perspective where ecosystems and the services they provide interact as part of a natural process within a specific spatial area.

The SEEA EA was adopted by the UN Statistical Commission in March 2021 as:

- the first international statistical standard on ecosystem accounting (chapters 1-7 on the accounting framework and physical accounts)
- as internationally recognized statistical principles and recommendations (chapters 8-11 on monetary accounts and valuation)

Developing ecosystem accounts in the EU

Ecosystem accounts at EU level

Ecosystem accounts at EU levelbf

INCA (Integrated Natural Capital and ecosystem services Accounting) was a joint project of Eurostat, DG Environment (DG ENV), DG Research and Innovation (DG RTD), the Joint Research Centre of the European Commission (JRC) and the European Environment Agency (EEA), running from 2015 to 2021. The project was developed to address key policy objectives of the EU's Environment Action Programme and the EU Biodiversity Strategy, . Its first objective was to pilot ecosystem accounts at EU level by integrating existing EU data sources, paving the way for for a regular production of ecosystem accounts in the EU in a comparable and coordinated manner. In addition to developing and employing biophysical models for building ecosystem services accounts, INCA integrated geospatial information with statistical datasets, as well as administrative data.

Ecosystem services accounts developed under INCA

Within INCA, the JRC published ecosystem services accounts for crop provision, timber provision, global climate regulation, flood control (access the full report here), water purification (access the publication here), crop pollination and nature-based recreation (access the full report here). Due to the varying and sometimes long data update cycles of the different input data sets, the current latest data point is 2021. A GIS-plug-in tool (so called 'INCA tool') was developed to speed up the production of ecosystem services accounts - a prerequisite for a regular data production. All results on INCA ecosystem services accounts, including accounting tables and maps, the INCA tool as well as a catalogue of output datasets and links to input data are available on the INCA website .

Extent accounts developed under the INCA project

Ecosystem extent accounts are about delineating ecosystem types and showing how they change over time. The EEA published first results in their natural capital accounting report in May 2019. Currently, these extent accounts cover nine ecosystem types. In the future, the plan is to develop a wider list of ecosystem types linked to the habitat classification of the EU nature information system . This would enable providing more detail on the development of the extent and spatial distribution of ecosystems in the EU.

Experimental ecosystem accounts in European countries

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Several European countries started experimenting in ecosystem accounting. Some of this work was supported by grants from Eurostat for National Statistical Institutes to develop ecosystem accounts.

- Bulgaria: The National Statistical Institute of Bulgaria developed ecosystem extent accounts for MAES ecosystem types and for Natura 2000 sites in Bulgaria for the years 1990, 2000, 2006 and 2012. In addition, the use of data such as cadastre data and statistical surveys was tested. Access the full report here .

- Denmark: The Danish Statistical Office developed experimental ecosystem services supply and use tables for a number of services such as crop, timber, fish, wild terrestrial animals, groundwater for drinking and outdoor recreation. Access the full report here .

- Estonia: In 2019, Statistics Estonia developed the first national level ecosystem extent accounts, linking these to economic sectors. Furthermore, they produced accounts for a large number of ecosystem services, including provisioning, regulating and cultural, and exploring a range of validation techniques and some policy uses, for grassland ecosystem type.

- Finland: In 2018, the Finnish Environment Institute (SYKE) together with the Natural Resources Institute Finland (LUKE) test piloted a monetary ecosystem asset account for commercial marine fish, developed supply and use tables for forest carbon related ecosystem services and pilot accounts for outdoor recreation. Access the full report here . Furthermore, in 2019 the same institutions developed ecosystem accounts for the marine environment, using data reported for the Marine Strategy Framework Directive , accounts for outdoor recreation in Finish lakes and explored some methodological question (valuation using simulated exchange values and the links between ecosystem condition and services). Access the full report here .

- Italy: The Italian Institute for Environmental Protection and Research (ISPRA), together with the Basque Centre for Climate Change and the Italian National Institute of Statistics (ISTAT) developed supply and use tables for outdoor recreation, crop pollination, flood regulation and water provision for regions in Italy. Access the full report here .

- The Netherlands: In 2018, Statistics Netherlands developed carbon accounts for the Netherlands. Access the full report, further information on the project and additional ecosystem accounting work here . In 2019, their project under Eurostat´s grant focus on pollinators and the use of remote sensing to identify their habitat and its quality. The report can be accessed here .

- The United Kingdom: The UK is at the forefront of developing ecosystem accounts in Europe. With Eurostat´s support, the UK Office for National Statistics (ONS) conducted a project assessing the restoration potential of ecosystems considering the expected future flow of ecosystem services, in physical and monetary terms, from restored ecosystems. The conceptual framework was then tested in a pilot study for peatlands. On overview of the work on ecosystem accounting by the UK ONS can be accessed here .

Policy context

In December 2024, the first EU legislation (Annex IX of amended Regulation(EU) 691/2011 on the European environmental-economic accounts entered into force. It specifies reporting requirements on ecosystem accounts for EU Member States. Starting from 2026, Member States will be reporting to Eurostat data on ecosystem extent accounts, seven ecosystem services accounts and ecosystem condition accounts for five types of ecosystem and using nine indicators, using common definitions - as specified in the legal text - and common methods - as developed by the Task force on ecosystem accounting and published at Eurostat's methodological website on the environment, under tab 'Ecosystem accounts' .

Explore further

Other articles

- Environmental accounts - establishing the links between the environment and the economy

Dedicated section

- Environmental accounts
- Methodology sources for environmental accounts