MAIA
Mapping and Assessment for Integrated ecosystem Accounting

The MAIA country fact sheets summarize the state of affairs on natural capital accounting (NCA) in the countries connected to the MAIA project. They serve as an accessible overview and entry point for collaboration. The factsheets describe the needs from policy, society, science and business for the use of NCA, give an overview of the ongoing and published research -including knowledge gaps- in the country, include contact details and an overview of national partners and stakeholders involved in the accounts. Information in this document is based on MAIA Deliverables and exchanges, and the content is reviewed, co-authored and updated by MAIA-liaison persons in the participating country. This version was updated on August 5th, 2022.

Country fact sheet:
Czech Republic (CZE)

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Summary

Czech Republic has been actively developing environmental statistics and accounts. Ecosystem accounting (SEEA EA) presents a new challenge for statistical systems. With the adoption of SEEA EA as an international statistical standard, Czech Republic initiated steps to implement ecosystem accounting as a component of environmental accounts.

The Working Group on Ecosystem Accounting has been established by the Czech Statistical Office in cooperation with CzechGlobe. Working group should coordinate and supervise efforts to develop key ecosystem accounts within the proposed Amendment of Regulation (EU) 691/2011 including ecosystem accounts.

In the Czech Republic, MAIA supported accounts include extent account and ecosystem services accounts. Ecosystem services accounts have been focusing on a carbon account (biophysical and monetary), a water purification account (biophysical and monetary) and a nature-based recreation account (monetary). Besides that, the application of the value transfer approach to ecosystem accounting the and water retention model has been tested. These pilot and other ES accounts would be further developed within a broad cooperation in Working Group on Ecosystem Accounting.

Country policy priorities for developing natural capital accounts

Based on MAIA D5.1 (Annex 3 section 3)

> Agriculture, water management and forestry are perceived as the most important sectors in which ecosystem accounting should be applied. Recent developments are reflecting the progress at the global and EU level and are focusing on key ecosystem accounting modules.

In an ideal scenario, ecosystem accounting would be applied to all policies that address the management of natural resources and nature conservation.

Development of natural capital accounts within the framework of SEEA EA is focusing mainly on ecosystem accounts modules proposed by the amendment of amendment of Regulation (EU) 691/2011, which include:

- Ecosystem extent accounts;

- Ecosystem condition accounts covering forests and woodland, agri-ecosystems and urban ecosystems;

- Ecosystem services accounts covering the actual supply and use of ecosystem services from the terrestrial ecosystems (including freshwater) on the national territory.

These priorities have been formulated at the first meeting of the Working Group on Ecosystem Accounting at the Czech Statistical Office in April 2022.

In relation to specific pilot accounts, the policy priorities that have been highlighted during the national stakeholders' consultation in June 2019 are the following:

- Agricultural ecosystem accounts have been discussed in the context of the Common Agricultural Policy pointing out the role of biodiversity (via e.g. organic farming), water retention in the landscape, and the number of inputs / intensities in the agricultural landscape (e.g. fertilizers, herbicides).

- Water accounts (e.g. lakes, rivers, dams) and surrounding landscapes as well as the wetland account; the participants agreed on the importance of these accounts, since they provide significant ecosystem services.

- Accounts for urban areas (e.g. Prague, Brno) mainly from the carbon point of view, and the role of greenery in adapting to climate change and to provide other benefits (e.g. recreation, health).

- A protected landscape area account that could be significant for both biodiversity and other ES (e.g. tourism).

Subsequently, thematic accounts were discussed, which either monitor important ES or environmental / human-related issues / interests:

- Water account in terms of quality, quantity and specifically water retention in the landscape;

- Carbon account for ecosystems and residential areas;

- Biodiversity account.

Pilot accounts under development
Summary table of accounts

Account		Ecosystem Types / Ecosystem Services	Link to research
Accounts for ecosystem assets	Ecosystem extent account	**All ecosystems (2000 - 2006 - 2012 - 2018)**	
	Ecosystem condition account	**Forest and woodland, agroecosystems and urban ecosystems**	Vačkářů and Grammatikopolou, 2019
	Ecosystem monetary asset account	**All ecosystems**	Vačkářů and Grammatikopolou, 2019
Accounts for ecosystem services	Ecosystem services supply and use table - physical terms	**Carbon sequestration**	
		Water retention	Krpec, in prep.
		Water filtration*	
	Ecosystem services supply and use table - monetary terms	**Carbon sequestration**	Grammatikopoulou and Vačkářová 2021
		Water filtration*	Horváthová, in prep.
		Nature-based recreation	
Thematic accounts			

Scale	State of development
National	Finished
Regional	Ongoing
<u>Local</u>	None ongoing or published
*Highlighted in the fact sheet	

Summary overview of highlight accounting projects

Ecosystem extent account and analysis of agricultural land

🌿 Scale
The study was conducted at the national scale. Time period covered includes horizons 2000 – 2006 – 2012 – 2018. The account is being updated using new information and data.

🌿 Involved and funding partners
The study was performed by the Global Change Research Institute CAS and funded by Technology Agency of the Czech Republic and MAIA, with the involvement of the Czech Statistical Office.

🌿 (Policy) Goal of the study
What are the changes of land cover / ecosystems types in the Czech Republic? What are the main factors influencing land cover change? Where is agricultural land disappearing?

🌿 Ecosystems under study
The study addressed all categories of ecosystems in the Czech Republic.

🌿 Methods and data used for the study (if relevant indicators used)
The study originally employed the methodology of Land and Ecosystem Accounting (LEAC) developed by the European Environment Agency. LEAC is based on Corine Land Cover (CLC) data which are regularly provided for European countries. The LEAC methodology enables to construct tables detecting land production and consumption. Moreover, by classifying land cover flows, it enables to categorise major types of changes between different categories of land cover. Updated extent accounts have been assembled according to SEEA EA guidelines.

Corine Land Cover data have been a major source but were complemented by other data on agricultural land from Czech Statistical Office databases and land cadastre. The extent account will be also constructed based on a detailed Consolidated Layer of Ecosystems, developed by CzechGlobe in cooperation with the Nature Conservation Agency.

🌿 Link to the research/reference
Dava Vačkářů & Ioanna Grammatikopoulou (2019) Toward development of ecosystem asset accounts at the national level, Ecosystem Health and Sustainability, 5:1, 36-46, DOI: 10.1080/20964129.2018.1560233
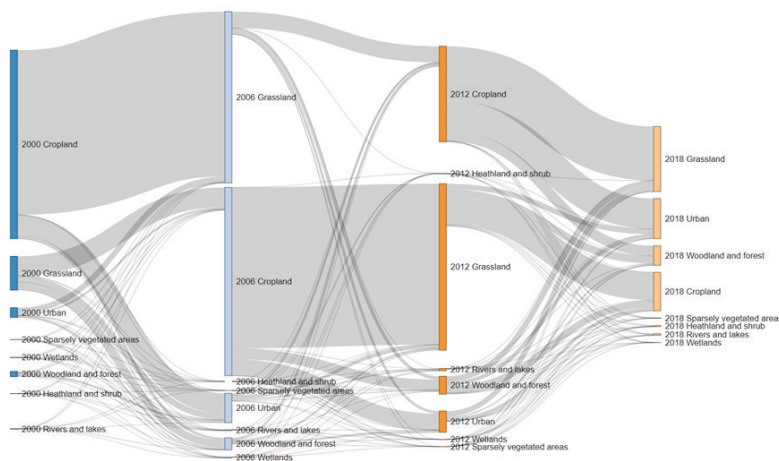
Figure

Ecosystem extent account for the Czech Republic 2000 – 2018 – changes in land cover according to Corine Land Cover.

	Ecosystem types									
	Measurement units	Cropland	Woodland and forest	Urban	Heathland and shrub	Grassland	Rivers and lakes	Wetlands	Sparsely vegetated areas	TOTAL SUPPLY
Ecosystem service										
Groundwater purification	K EUR/ year	9,533	6,746	2,626	2,274	1,806	274	31	2	23,293
Total										23,293

Supply monetary account for drinking water purification

	Institutional sector									
	Measurement units	agriculture	forestry	fisheries	mining and quarrying	manufacturing	construction	electricity, gas supply	water collection, treatment, supply	other industries	households	TOTAL USE
Ecosystem service												
Groundwater purification	K EUR/ year								23,293			23,293
Total									23,293			23,293

Use monetary account for drinking water purification

Drinking Water Filtration Account for the Czech Republic

🪶 Scale

The analysis covers the year 2018 only but we plan to extend the analysis and estimate how the drinking production costs have developed during a longer period. The extent of the planned study depends on data availability.

🪶 Involved and funding partners

Data were provided by the Ministry of Agriculture

🪶 (Policy) Goal of the study

The goal of the study is to find which factors influence drinking water production costs. We expect that drinking water production costs are lower if the drinking water is produced from groundwater (after controlling for the treatment technologies) because groundwater is of better quality due to natural water filtration. Furthermore, we suppose that the water production costs are given not only by the raw water source (underground vs. surface) but also by the treatment technology. We expect that some treatment technologies e.g. iron removal or demanganization can significantly increase drinking water production cost.

🪶 Ecosystems under study

Freshwater Ecosystem, Groundwater

🪶 ES/thematic account under study

Water filtration

🪶 Methods and data used for the study (if relevant indicators used)

We apply the replacement cost approach to measure the difference in production costs of drinking water from groundwater relative to surface water. This approach has been applied also in the Netherlands e.g. in Horlings et al., 2020; Remme et al., 2015. The unit value of the ecosystem service (provision of drinking water through the natural filtration and storage of groundwater) was calculated as the difference in the unit production costs of companies that mainly extract groundwater and companies that mainly extract surface water. Contrary to the Dutch studies we study not only the impact of the raw water source (underground vs. surface) on the drinking water production costs but also the impact of treatment technologies.

The 2018 dataset contains yearly data for all water withdrawal points in the Czech Republic from which drinking water is commercially produced (over 3,500 observations) on e.g. total amount of drinking water produced from surface water and underground, amount of technological water produced, data on water analyses, unit production costs, consumption of electrical power, raw water quality, water treatment technologies – chemical and physical, kind of chemicals applied. The data are obtained from datasets which owners and operators of water supply and sewerage systems submit to the Ministry of Agriculture as a part of a regulatory process.

🪶 Research cited in the methods:

Horlings, E., Hein, L., Jongh, L. De, & Polder, M. (2020). Experimental monetary valuation of ecosystem services and assets in the Netherlands. Technical background report (Issue January). https://www.cbs.nl/en-gb/background/2020/04/monetary-valuation-of-ecosystem-services-for-the-netherlands

Remme, R. P., Edens, B., Schröter, M., & Hein, L. (2015). Monetary accounting of ecosystem services: A test case for Limburg province, the Netherlands. Ecological Economics, 112, 116–128. https://doi.org/10.1080/20964129.2018.1560233

🪶 Approximate date of final results

The analysis of the 2017 year was finished and the scientific paper is submitted to the One Ecosystem journal. Next, we will try to obtain data for other years, and depending on the data available we will analyze other years.

Knowledge gaps and difficulties for developing natural capital accounts

Based on MAIA D3.2 (Annex 3 section 5);

D5.1 (Annex 3 section 5e and 6d)

> At the beginning, the key gaps for developing NCA in Czech Republic was non-existing political demand for ecosystems accounting and data gaps. However, some of these limitations have been overcome and the process of SEEA EA development and implementation has been launched. There are still several challenges including harmonized methodology and data availability, as well as policy acceptance of ecosystem accounts.

The development of ecosystem accounts gained momentum with the establishment of the Working Group on Ecosystem Accounting coordinated by the Czech Statistical Office and Czech-Globe. However, there is insufficient harmonization of existing data sources and data flows, including a missing common unified database. It was recommended to begin with the adjustment of existing data e.g. on biodiversity and/or water and show the usefulness of ecosystem accounting.

This demonstration of the value of NCA is necessary to create political acceptance of ecosystem services accounts. There is a general lack of knowledge and awareness about ecosystem accounting, and a perception of low usefulness of and urgency for ecosystem accounting. One of the barriers is the policy acceptance of especially monetary ecosystem services accounts. Up until now, the principal source of funding for NCA projects comes from European initiatives such H2020 funds. It will be still challenging to mobilise funding for the implementation of ecosystem accounting after the MAIA project.

Other problems for the development of NCA are low capacities and a lack of clear guidelines to implement some points of the SEEA framework.

There has been a good progress in starting the coordination efforts on ecosystem accounting as well as identifying policy needs and priorities and realizing the challenges ahead. In pragmatic terms, the state of data availability as well as the methodology of compiling the accounts, are yet to be defined and reported. The participation of CzechGlobe in the MAIA project provided a great opportunity in data integration and in improving the information on the state and trends of nature.

Involved partners and stakeholders

Based on D5.1 (Annex 3 section 2);
European NCA stakeholder day

Government / Ministry of Agriculture	Research	Private sector or NGO
Czech Statistical Office (CZSO)	Global Change Research Institute CAS (CzechGlobe)	Povodí Vltavy*
Ministry of Environment	Charles University Environment Centre	Povodí Labe
Czech Environmental Information Agency	Research Institute for Soil and Water Conservation	Povodí Ohře
Czech Hydrometeorological Institute	Forest Management Institute	Povodí Moravy
Ministry of Agriculture		Povodí Odry
Czech Nature Conservation Agency		Czech Ornithological Society

* Povodí (river basin) are state-owned organizations.

Support needs for developing natural capital accounts

Based on MAIA D3.2 (Annex 3 section 6 and 7);

D5.1 (Annex 3 section 6e, 7 and 8)

> The main barriers for setting up the NCA can be explained by a lack of capacity and, related to that, a lack of funding. Institutions would need an official policy enforcement to start working on the accounts. Therefore, there is a need for more training, capacity building and increased sharing of information and lessons learned by the MAIA MS. This would enable the Czech Republic to develop complete set of ecosystem accounts that can demonstrate the usefulness and spark political interest.

There is a need to improve the technical capacity of the institutions involved in ecosystem accounting. This includes training courses, technical seminars and knowledge sharing on more specific ways to implement the methodology. On the other hand, the capacity building should go even further with more systematic communication between MAIA partners, especially the most advanced, to share information, experiences, and lessons learned.

In principle, representatives of key government institutions would be willing to participate in these types of training. Continued cooperation with the Czech Statistical Office and other actors relevant for the development of ecosystem accounting will continue within recently established Working Group on Ecosystem Accounting. To aid this process, final accounts based on an adjustment of existing pilots and data flows should be reported. This would demonstrate how SEEA EA could be useful in supporting decision-making on ecosystems and biodiversity.

Moreover, institutions would need an official policy enforcement to start working on the accounts. This could be for example the amendment of Regulation (EU) 691/2011 or Government resolution. Otherwise, representatives of key government institutes will remain hesitant particularly due to the low staff availability and capacity needed in accounting work.

References

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