

Cullen Scholarship: Developing ecosystem accounting for Ireland’s marine and coastal ecosystems (PhD Award)

Background

Adoption of chapters 1 to 7 of the System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA) (UNSD, 2021) as international statistical standards by the United Nations Statistical Commission in 2021 was an important step in standardising the measurement of nature’s contribution to nations’ economies. The core accounts measure the extent and condition of ecosystems, the flow of ecosystem services and the value of ecosystem assets. The accounts can be presented both in physical terms and monetary terms, the latter aligned with the monetary valuation of the System of National Accounts used for measuring economic indicators such as gross domestic product (GDP). In addition, the SEEA-EA also describes the development of standalone accounts called thematic accounts including ocean accounts.

The Regulation on European Environmental Economic Accounts is to include a module on Ecosystem Accounts. It is expected that reporting to Eurostat on the Ecosystem Accounts module will become mandatory in 2026 for the reference year 2024. In Ireland, this reporting will be undertaken by the Ecosystem Accounts Division (EAD) of the Central Statistics Office (CSO) as part of its role in compiling Ecosystem Accounts for Ireland at national level. A Eurostat task force on the implementation of SEEA-EA stated marine accounts were a high priority but are faced with a number of challenges in developing standardised reporting. These challenges include;

- (i) the dispersion of the information,
- (ii) the lack of completeness of EU-wide marine-related datasets, and
- (iii) the specific challenges due to the mobility of marine species and the 3-dimensional aspect of marine ecosystems.

Given the above challenges, mandatory reporting for marine and coastal ecosystems is initially expected to be limited to extent accounts for marine ecosystems but to cover extent, some condition indicators, and selected ecosystem services accounts for coastal wetlands, beaches and dunes.

Natural capital accounting research and work in demonstrating the application of SEEA-EA for ecosystem accounting has been undertaken at a variety of scales from EU to subnational (Vallecillo et al., 2019, Farrell et al., 2021, van Berkel et al., 2021) but has generally focused on terrestrial ecosystems. There has been some previous work in Ireland focused on marine and coastal ecosystem services (Norton et al., 2018) with recent scoping work suggesting the use of ecosystem accounting using the SEEA-EA approach at bay-scale in Ireland (Mcleod et al, 2019). Additionally, due to the spatial nature of the application of SEEA-EA, marine ecosystem accounts may also be a useful tool for stakeholders and decision makers in marine spatial planning as noted in the National Marine Planning Framework (ABPmer et al., 2020, DHLGH, 2021).

The CSO aims to progress the development of ecosystem accounting using the SEEA-EA approach for marine and coastal ecosystems using Ireland to demonstrate how this can be done. The significant amount of marine data available for Ireland, much of it created and held by the Marine Institute, provides a suitable basis for extending the application of ecosystem accounting further than the expected mandatory reporting requirements.

Proposal

We propose a **structured four-year PhD** on a full-time basis to investigate how System of Environmental-Economic Accounting—Ecosystem Accounting can be applied to Ireland’s coastal and marine ecosystems. The project will aim to:

- Conduct a literature review for application of ecosystem accounting and natural capital accounting, particularly the SEEA-EA approach, to marine and coastal ecosystems.
- Develop a method of linking existing marine ecosystem extent datasets to the Mapping and Assessment of Ecosystems and their Services (MAES) classification or any enhanced approach and the creation of a set of extent accounts for Ireland’s marine ecosystems.
- Develop a methodology to assess the condition of Ireland’s marine ecosystems in line with the SEEA-EA approach and to create a set of condition accounts for Ireland’s marine and coastal ecosystems including reference values and mapping of condition indicators
- Map and evaluate in physical and monetary terms selected ecosystem services and examine the challenges in developing a set of ecosystem service accounts and valuation of Ireland’s marine and coastal natural capital. This should include linking the services and values to marine spatial planning objectives with the aim of providing evidence to support marine decision-making
- Identify any data gaps in accounts and identify the appropriate data required to resolve these gaps found in the process of creating accounts.
- Increase the understanding of how the provision of ecosystem services is impacted by anthropogenic pressures.

Location of Scholar

The PhD student will be based in their host Higher Education Institute (HEI) and in the Marine Institute primarily. It is also expected that the successful candidate will collaborate closely with the Ecosystem Accounts Division at the CSO based in Dublin, and attend at their premises for a minimum of 36 weeks over the final three years of the PhD. Overall this breakdown in time between the institutions is expected to be circa 40/40/20 in blocks of time between HEI/MI/CSO. This will be agreed between the HEI, MI and CSO supervisors.

Outcome

The student will undergo a four-year training period learning new research methodologies resulting in a PhD thesis, comprising at least three chapters (preferably published in peer review journals). The expected outcome of this project is a fit for purpose framework and methodology for applying System of Environmental-Economic Accounting—Ecosystem Accounting to Ireland’s coastal and marine ecosystems. Additionally, the accounts produced should comply with Eurostat reporting requirements, and should form part of the CSO’s statistical outputs.

Links with Marine Institute Strategic Plan 2018-2022

This proposal is in alignment with the driver, Integrated Maritime policy & Blue Growth. Specifically, this proposal falls within Strategic Focus Area 1 – Scientific Advice and Services, specifically within the initiative, Meeting the Needs of Decision makers. The research also links to Strategic Focus Area 4 – Ireland’s Ocean Economy, providing evidence and data to support the sustainable development of Ireland’s ocean and coastal economies.

Specific Requirements

The applicant should have a primary degree in either:

- Biological sciences with a strong Environmental or Ecological modelling component, **or**
- A numerate subject (e.g. maths, economics, statistics, physics etc.), and a further biological sciences qualification or Masters in Environmental Economics or similar.

Other requirements include strong analytical skills and high numerate capability including statistical programming capacity (Stata, R, Python). Experience of manipulating large databases and utilisation of GIS and other visual applications would be beneficial.

Financial Details

Scholarships will be up to €27,500 per annum (maximum funding of €110,000 over four years). This amount comprises a maintenance award of €18,500 (Irish Research Council rate effective 1-Jan-21) to the student as well as payment of fees to the host higher education institution (HEI). The maximum fees payable to the HEI will be €6,000 per annum. The scholarship award also includes a budget of up to €3,000 per annum for eligible research costs (travel & subsistence, publication costs, consumables and other costs e.g. laptop) for the sole use of the student, and are payable on a reimbursement basis direct to the host institution where the postgraduate student (scholar) is registered. There are no overheads payable on the scholarship. Publication costs are intended to cover publications on which the scholar is listed as first author and are published under Open Access. Scholars can also apply for additional funding under the [Marine Institute’s Networking Initiative](#), which is an annual call.

Marine Institute Co-Supervisor

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Glossary

SEEA-EA - System of Environmental-Economic Accounting—Ecosystem Accounting

GDP – Gross Domestic Product

UNSD – United Nations Statistics Division

EAD – Ecosystem Accounts Division

CSO – Central Statistics Office

MAES – Mapping and Assessment of Ecosystem Services

DHLGH – Department of Housing, Local Government and Heritage

References

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Vallecillo, S., La Notte, A., Ferrini, S. and Maes, J., 2019. How ecosystem services are changing: an accounting application at the EU level. *Ecosystem Services*, 40, p.101044.

van Berkel, J., Bogaart, P., Driessen, C., WUR, L.H., Horlings, E., de Jong, R., de Jongh, L., WUR, M.L., Mosterd, R. and Schenau, S., 2021. Natural Capital Accounting in the Netherlands.