IDEEA Group

Institute for Development of Environmental-Economic Accounting

NATURAL CAPITAL ACCOUNTING

DESIGN AND IMPLEMENTATION PROTOCOL

V 1.1

Institute for Development of Environmental-Economic Accounting
Melbourne, Australia 3078 ABN 22 608 437 056
www.ideeagroup.com

IDEEA Group
ACN 608 437 056
www.ideeagroup.com
Melbourne, Australia

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INTRODUCTION

An understanding of natural resources in terms of environmental, social and governance (ESG) considerations has become a focal point for both shareholders and regulators across the world. Climate risk and other environmental risks, such as water scarcity and biodiversity loss, are being recognised as material exposures to be managed and a renewed focus on decarbonisation and nature conservation is shaping organisational strategies across virtually all industries.

In order to meet regulatory expectations, design novel products and processes, and effectively manage risks, organisations must have an ESG strategy underpinned by a clear and robust environmental monitoring and reporting framework. By understanding and effectively managing environmental data, scenario analysis, performance tracking and environmental risk measurement all become possible.

Furthermore, for financial markets to operate effectively and efficiently they must incorporate clear, well defined, standardised, and coherent information. To this end, markets operate using data based on financial accounting standards that guide the collection, production and disclosure of financial (economic) information.

Natural resources, including biodiversity and ecosystems, are a key factor underpinning economic and financial activity. However, current financial accounting standards do not adequately reflect how transactions in the economy impact and depend upon natural resources. There is missing information on the relationship between financial (economic) performance and environmental outcomes. Because there is missing information, decision-makers in the economy do not systematically account for impacts and dependencies on natural resources when they utilise them as part of their economic activity.

Natural capital accounting (NCA) standards based on the System of Environmental-Economic Accounting (SEEA) are designed to fill that missing information gap. NCA provides the clear, well defined, standardised, and coherent information set needed to extend current financial accounting data and meaningfully describe the relationship between the economy and the environment. Having that set of coherent information allows market participants in the economy and other decision makers, including consumers, to account for their dependencies and impacts on natural resources.

This document sets out IDEEA Group's approach to compiling Coherent Environmental-Economic Data (CEED) to support policy and decision-making. The process contains five high level steps. The SEEA's accounting principles are applied to define the measurement boundaries and the set of concepts and definitions that support comparability and coherence between environmental and economic domains. The document does not contain the detail needed to complete each of the five steps. In practice, there is no single recipe because each organisation is different and operates in a different context.

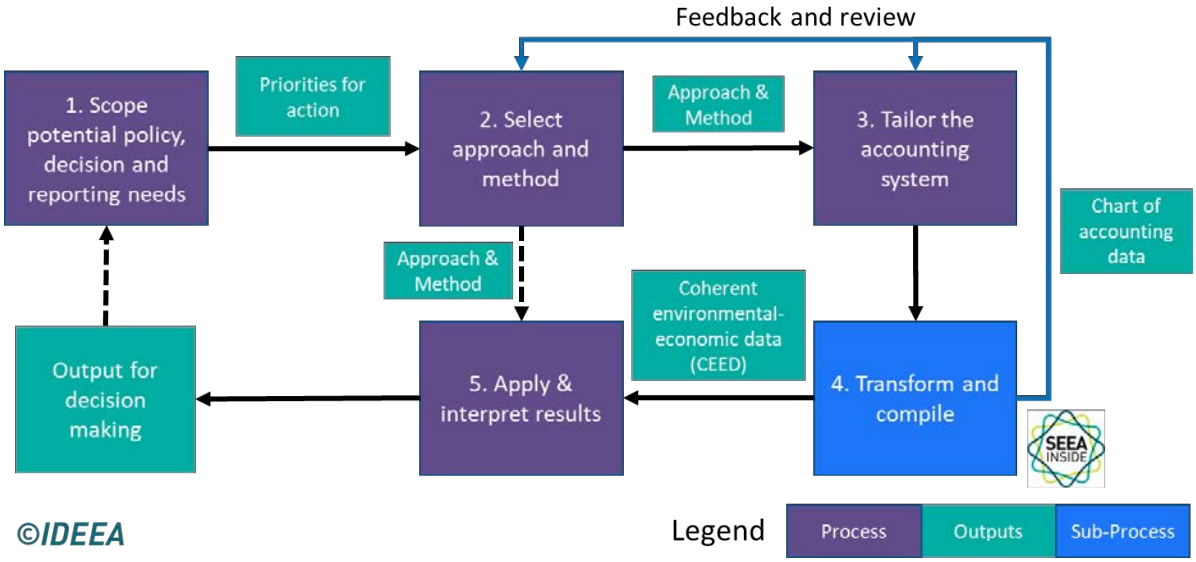
With over 25 years of experience in NCA, IDEEA Group are experts in applying NCA standards and guidelines to extend current market information from a purely economic set of data to a

coherent set of environmental-economic information. IDEEA Group specialises in supporting governments and organisations understand the changes that are required to make this transition.

PROCESS OVERVIEW

The five steps for designing and implementing natural capital accounting (NCA) and compiling CEED are shown in Figure 1. Completing steps 1-3 ensures the data collection and transformation and account compilation steps results in meaningful and interpretable approaches and results.

Figure 1 Process to compile environmental-economic data for decision-making



The process described in Figure 1 can be readily aligned with other natural capital approaches including the Natural Capital Protocol[1]. For example, the Natural Capital Protocol Frame and Scope stages are equivalent to steps 1 and 2; the Measure and Value stage is equivalent to steps 3 and 4 and finally the Apply stage is reflected in steps 5.

A key feature of the approach is use of the SEEA. This drives the internal coherence of the data, allows for direct connection between private/business level data and public sector information and supports comparability across locations and sectors. The approach also makes a clear distinction between the application of the data and the generation of coherent data. This feature allows a single CEED to support use of a range of natural capital related reporting and analytical approaches including environmental accounts, ESG and sustainability reporting, risk assessments (e.g. TCFD), certification (e.g. Forestry, Water, Organics, Biodiversity, Carbon) and productivity analysis.

This process is also amenable to considering multiple capitals. Here the integration of natural and produced capitals is the focus but the conceptualisation can be extended to the integration of human and social capital following the same process. (For further detail see *'Applying the TEEBAgriFood Evaluation Framework: Overarching Implementation Guidance'*[2].)

[1] https://capitalscoalition.org/project/combining-forces-on-natural-capital/ https://capitalscoalition.org/wp-content/uploads/2017/11/NCP-SEEA-Toolkit-Sep-2017-IDEEA-Group-1.pdf
[2] https://futureoffood.org/wp-content/uploads/2021/01/GA_TEEBAgriFood_Guidance.pdf

Finally, the process specifications provided here, and the use of the SEEA's standard concepts and definitions support:

- **Continuous improvement**: By having a process in place it is possible to identify pain-points, data gaps and make improvements over time. It is possible to run the process on part of a business or across the whole business and assess how the business is performing and then roll it out the process more fully at the later date.
- **Certification:** Steps 3 and 4 follow the SEEA standards and guidelines so the CEED and accounts can be certified by an independent party thus adding credibility to the outputs.
- **Audit:** Data and information systems used can be audited to ensure appropriate meta-data and data storage standards have been followed (for instance ISO 14001, 8000).
- **Assurance of the process**: Due diligence has been given to ensure the accounting system meets the needs of business and there is documentation of steps 1 to 5 and any decisions that have been made in their implementation. The enables a business the repeat the process further contributing to audit, continuous improvement and reducing the cost of managing environmental-economic information.

STEP 1 – SCOPE POTENTIAL POLICY, DECISION AND REPORTING USES

This step involves listing and describing the potential uses for CEED. In this step, IDEEA Group will work with organizations to identify the potential uses of CEED across the organization and within respective business units. A description of the uses of CEED (the what) should be accompanied with a description of why it is important (the why), and teams involved (the who).

The following are high level examples of possible uses:

Supporting business decisions

- Natural capital impact and dependency assessments for insurance and risk markets
- Natural capital assessment to support ESG reporting and sustainability disclosure in financial markets (portfolio level and product level)
- Environmental markets, including conservation and ecosystem service markets
- Natural capital benchmarking to inform and support farm to plate reporting to consumers
- Natural capital assessment to support ESG risk management including climate risk exposure management and scenario analysis
- Certification schemes to ensure ongoing market access

Sustainability reporting

- Sustainable Development Goals (SDG)
- Convention on Biological Diversity (CBD)
- State of the environment reporting (SOE)
- Corporate social responsibility (CSR) reporting

Performance reporting

- For environmental management to deliver economic and social outcomes effectively and efficiently
- Monitoring and evaluation reporting schemes (MER)
- Public environmental expenditure programs
- Scenario analysis
- Risk assessment and due diligence
- Product traceability and impact assessment (extended lifecycle analysis)

The outputs from step 1 help to identify priorities and guide the design of CEED, the collection of data and focus on use. It is expected that the list of potential uses is large however there is often a degree of connection and overlap, which provides opportunities for identifying cross-cutting data solutions. Further, scoping helps to inform resource allocation and communication needs through the process. The table below provides several examples of what the outputs from this step should look like.

Table 1 Examples of purpose, driver and teams involved

Use (what?)	Driver (why?)	People involved (who?)

To participate in environmental markets	Opportunity in increase revenue streams and deliver environmental benefits	Farmers, governments
To make a business case for additional investment in natural capital	To secure the supply of important ecosystem services to the community	Natural capital managers; Regional partners Central government; Local communities
To demonstrate sustainable management of a natural resources (farming system)	To maintain market access and reduce the cost of funds from banks	Farmers; Banks; Consumers

STEP 2 – SELECT APPROACH AND METHOD

In this step, the link between a potential use and CEED is made explicit in order to target the design of a CEED. For this purpose, both an analytical approach and methods should be specified. Thus, it is not sufficient to identify an objective such as understanding the social and economic benefits of investments in native vegetation or calculating a return on investment. What is required is a more complete description of the methods to be used to calculate or demonstrate the benefits and returns. In particular, consideration should be given to how changes in the environmental variables being considered, e.g. rainfall, vegetation cover, relate to particular environmental and economic outcomes such that the effects of policies and investments can be understood.

Examples of approaches include cost-benefit analysis, standard accounts, scenario analysis, impact evaluation, return on investment and sustainability reporting. Methods concern specifications on the variables required to implement the analytical approach. Building on the examples from Table 1, table 2 provides examples of approaches and methods. Box 1 provides a more extended example.

Table 2 Examples of approaches and methods linked to use

Use	**Approach**	**Method**
To participate in environmental markets	Monitoring of environmental performance	Measure and report changes in dissolved oxygen and nutrient content
To make a business case for additional investment in natural capital	Return on investment (ROI)	Measure the change in riverine water quality linked to investment in riparian zones (extent, condition, etc)
To demonstrate sustainable management of a natural resources (farming system)	Scenario analysis	Measure the variability in pasture production over

		time and how it is linked to land management

Box 1

The natural resource management team is in the process of determining future budget allocations. The team currently uses a consultative approach to determine where expenditure will occur and which natural resources will be the focus of investment. However, the team recognises that the consultative approach is difficult to replicate and after the investment has been made, they cannot objectively compare the effectiveness of the investments across the different natural resources. Those providing the funding are happy that a consultative approach is being used but need more information to justify further or increased budget allocations.

The team thinks that there is good reason to invest across a suite of natural resources, but they can't say why a particular investment is important and how the investment return varies across the natural resource classes.

For the team to make more informed decisions they need data and information that links an investment to changes in economic and social benefits. The team can then compare the benefits of investing in individual natural resources, with the benefits of other capital expenditures, and can allocate budget accordingly. With this objective in mind, it was decided the analytical approach that will be used is cost-benefit analysis. This will allow the team to make an assessment of the cost-benefit for each investment.

In this case description of the method will make explicit how the costs and benefits will be measured and how they relate directly to an investment. Importantly, the cost-benefit analysis will have to make explicit the link between ecological change (extent, condition, services) and economic costs and benefits.

Monitoring the natural resources and how they change over time in response to the investments can be used to calculate actual returns on investments and evaluate the management choices.

STEP 3 – TAILORING THE ACCOUNTING SYSTEM

Using the findings from step 1 and 2, in step 3 IDEEA Group will tailor an accounting system to support implementation of the analytical approaches and methods identified in step 2. The tailoring process leads to the development of a chart of accounting data. In line with the SEEA, the chart of accounting data will include a range of accounts each relating to different parts of the information set. Table 3 shows the links between different types of accounts and various uses. The key messages from the table are that each account will support multiple uses (reading down the columns) and that a single use will involve data from a number of accounts (reading across the rows).

The tailoring process will also establish the ideal granularity and frequency to deliver on the approach and method in step 2. For example, an ecosystem extent account may need specific ecological classifications at a resolution of 50m by 50m and a time series of at least three observations.

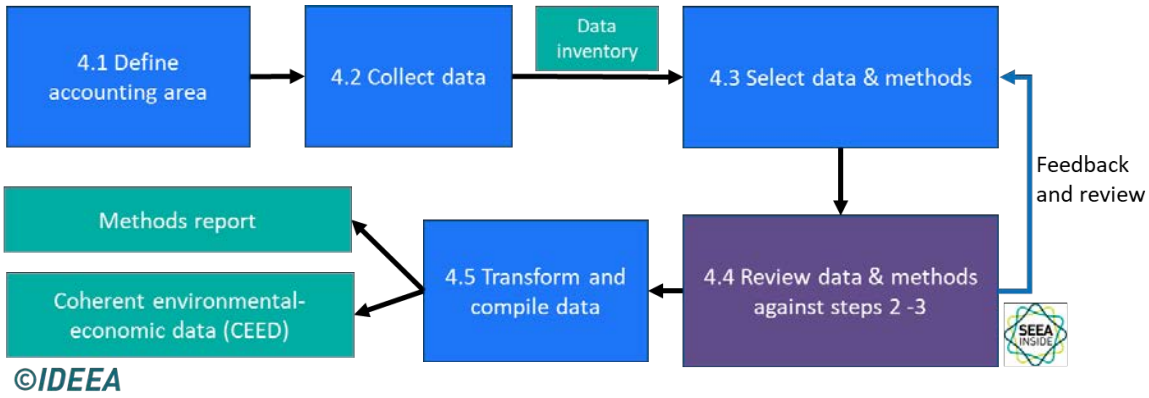
Table 3 Alignment between accounting data and potential priority issues and applications

	Ecosystem Accounts				Other Natural Capital Accounts				Other Data			
Potential Priority Issues & Applications	**Ecosystem extent**	**Ecosystem condition**	**Ecosystem services (physical & monetary)**	**Ecosystem asset values ($)**	**Carbon**	**Water**	**Biodiversity**	**Land use**	**Energy accounts**	**Environmental management costs & inputs**	**Production, Revenue & Costs**	**Employment**
Sustainability reports & natural capital narratives												

STEP 4 – TRANSFORM AND COMPILE

This step includes the compilation and assessment of both data and methods to populate the chart of accounts. Step 4 has five sub-steps (Figure 2). The outputs from these five sub-steps will include a data inventory, CEED and documentation detailing the methods used.

Figure 2 Overview of sub-steps contained in step 4

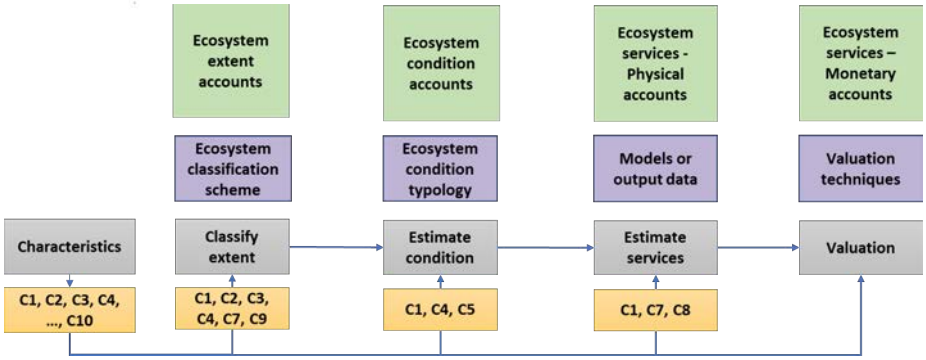


Note: The boxes in purple link back to the steps or outputs in Figure 1.

The process for undertaking step 4 follows the core ecosystem accounting framework shown in Figure 3. Natural capital (ecosystem assets) is delineated in terms of spatial areas which have an extent (e.g. measured in hectares) and a condition (or quality), and each asset supplies ecosystem services which are, in turn, used in the production of benefits which have value in the economy. An important feature of step 4 is ensuring the approach used to define ecosystem assets is consistent and valid across ecosystem types and the approach can be used to inform measures of ecosystem condition and the estimation of services.

In effect, the coherence within the CEED arises from ensuring that where a particular characteristic is relevant in the measurement of different components, the same data and methods are used for that characteristic throughout the accounting system. For example, canopy cover will be a relevant characteristic in measuring and classifying ecosystem extent, ecosystem condition and in modelling some ecosystem services. In this case, canopy cover is used consistently in each component of the accounting framework for a given accounting area.

Figure 3 Core ecosystem accounting framework[3]



Step 4.1 Define accounting area

Defining the accounting area needs to consider the following questions:

- What is the geographical area that aligns with the policy and decisions of interest?
- Are there downstream impacts, or upstream dependencies (drivers, pressures, source of residuals, inputs) that need to be considered in the selection of the accounting area?
- How does the accounting area align with administrative (driven by the policy or decision context) and ecological boundaries?

Depending on the answers to these questions, the extent of all ecosystems will be classified and mapped in the accounting area. The accounting area may be a sub-set of the full area of interest to test the approach, however it should then have as many characteristics as possible that are similar to the full area of interest

Output: Accounting area defined in a shapefile (or similar format) that can be used (i) to underpin the organization and alignment of data; and (ii) to support integrated analysis.

Step 4.2 Collect data

Data will be collected following the listing in the chart of environmental and economic accounting data and will include extent, condition, physical (water stocks and flows, carbon, soil, species, ecosystem services) and monetary (value, benefits) accounts (Figure 3). The collection will include existing data from both public and private sources and potentially newly collected data.

Output: Data inventory describing the source and format of the data and any other metadata that may be relevant to its assessment in Step 4.3. A standardised template for the documentation of the data is used.

[3] https://seea.un.org/ecosystem-accounting
Eigenraam & Obst (2018): Extending the production boundary of the System of National Accounts (SNA) to classify and account for ecosystem services, Ecosystem Health and Sustainability, https://doi.org/10.1080/20964129.2018.1524718

Step 4.3 Select data and methods

As noted above the selection of data and methods will be done both within each element of the core accounting framework (asset, condition, services, valuation) and across each element to ensure two-dimensional coherence.

This step involves assessing the data that is available and selecting methods for producing the CEED. Methods include interpolation of data, modelling of data, extrapolation of data and any other transformations that need to be undertaken to make the data coherent and suitable for the approach. The selection of the methods will largely depend on the data that is available, the accuracy of the information needed for the approach, and the resources available.

The data and methods are ranked as a Tier 1, 2, or 3 where Tier 3 is the best method available. The application of a Tier 1 method is not a bad outcome and would generally reflect the maturity of the organisation with respect to their journey creating CEED and the data that is available.

The tiered assessment of data and methods includes an assessment of the alignment with the concepts and definitions of the SEEA, data quality, data transformation methodologies, temporal relevance and consistency of data and the coherence of data and models. The tiered assessment of the data and methods is useful because it helps to inform the direction of future investments in data and methods and provide transparency to users of the information and outputs. An overview of the approach to determining Tier 1, Tier 2 and Tier 3 is provided in Appendix I.

Step 4.4 Review steps 2 to 3, given proposed methods.

A review of steps 2 and 3 will be undertaken to ensure alignment between the intended uses and the analytical approaches and methods. In practice, the approach outlined in step 2 may need to be adjusted, and there should be a comparison of the tailored chart of accounts outlined in step 3 compared to what the methods are likely to produce. For example, there may be insufficient data to create estimates of water flow. The purpose of this review is to manage expectations in terms of the outputs and provide recommendations for improvement for the next iteration.

Step 4.5 Transform and compile data

Following the review (step 4.4), the data will be transformed using the methods selected and assessed for accuracy and completeness within each data layer. The CEED is then compiled by integrating the transformed data This step will involve a range of plausibility and data coherence checks to ensure that the story conveyed in the accounts in meaningful.

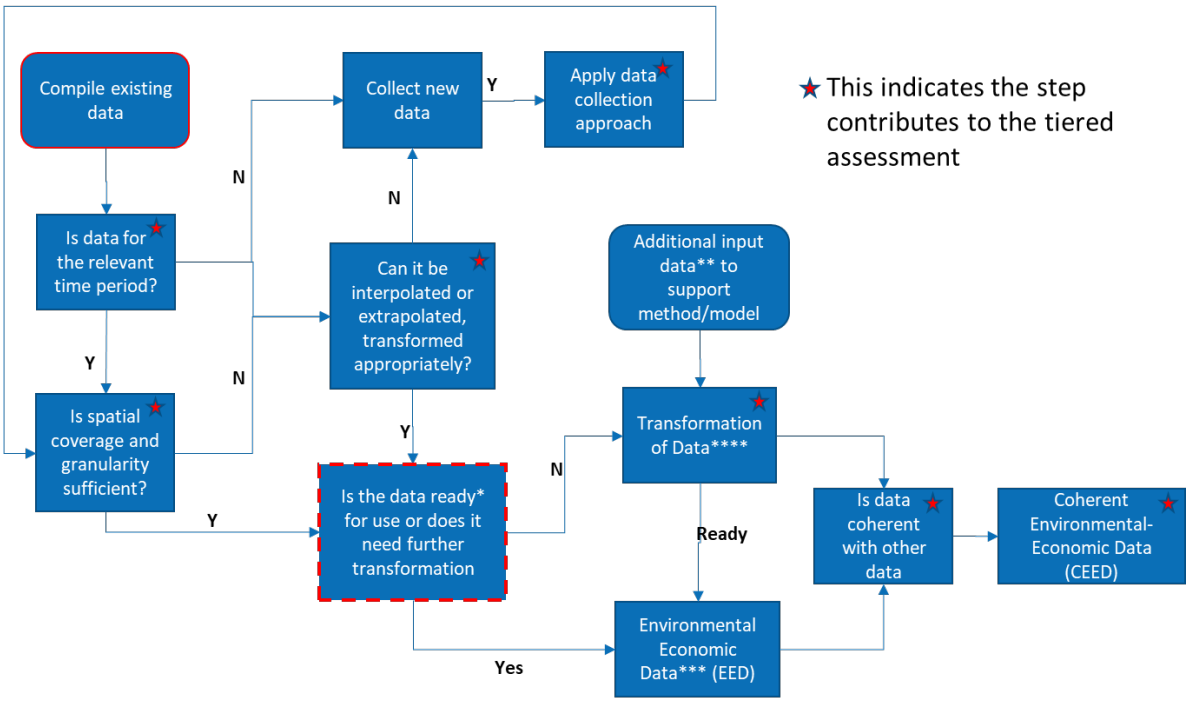
During the transformation and compile process issues may arise which require reviewing the data and methods selected in step 4.3 which in turn may result in revisiting step 4.2 and sourcing alternative data and or collecting new data.

Output: CEED, Methods document

STEP 5 – APPLY AND INTERPRET RESULTS

This step involves using the CEED to employ the approach and methods described in Step 2. There will be a series of outputs that will be used to support the priorities for action from Step 1. The results are interpreted and assessed against Step 1. By connecting back to step 1 the process can be refined and the priorities for action can be updated. It may be that further work is required or a set of recommendations can be developed for future iterations of the process. However, the NCA infrastructure is now in place so the process can be completed faster and at low cost.

APPENDIX I – OVERVIEW OF TIERED ASSESSMENT OF DATA AND METHODS



***Ready – Does it meet EA accounting standards**
**** Input Data has been through the same process**
***** This is a set of data for one element of the core accounting model, a further step is required to ensure coherence with data in other elements**

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