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Key challenges in implementing the System of Environmental-Economic Accounting**Implementation of the System of Environmental-Economic Accounting Central Framework in the Netherlands****Note by Statistics Netherlands***Summary*

This paper addresses the key drivers and challenges of implementing the System of Environmental-Economic Accounting in the Netherlands, and the issue of coordination between a national statistical institute and other institutions, such as ministries and research agencies. In the last twenty years, Statistics Netherlands has implemented a large part of the System of Environmental-Economic Accounting. The focus has been on the compilation and dissemination of physical flow accounts and monetary environmental activity accounts. Asset accounts have been less developed, primarily because the Netherlands has relatively few natural resources.

Three key drivers can be identified in the implementation process. First, Eurostat work in the area of environmental accounting and the on-going legislative process at the European level have been very important for the development of several key accounts. Secondly, specific policy demands at national level have led to the development of a number of specific accounts that are now published on a regular basis. Examples include the water accounts, which serve the data requirement for reporting to the Water Framework Directive, and the Economic radar of the Sustainable energy sector commissioned by the Ministry of Economic Affairs. Lastly, Statistics Netherlands' research programme for sustainable development and green growth has resulted in the development of additional accounts, such as for emission permits and the carbon footprint. Once implemented, these data were immediately used by policy makers, private companies and the general public.

I. Introduction

1. It has been increasingly recognised in recent years that conventional measures of economic activity need to be broadened and complemented to inform society better about the contribution of the environment and its capacity to render services to present and future generations. This may result in a strong demand for the System of Environmental-Economic Accounting Central Framework (SEEA-CF) that was adopted as an initial version of an international standard by the United Nations Statistical Commission (UNSC) in February 2012 (Statistical Commission, 2012). The availability of internationally comparable accounts is obviously an important goal.

2. The UNSC recognised that the next challenge would be the implementation of SEEA-CF, which was considered as a long-term programme (Statistical Commission, 2012). In 2012, a Taskforce of the UN Committee of Experts on Environmental-Economic Accounting (UNCEEAA) was commissioned to draft an implementation strategy, which was presented to and accepted by the UNSC in February 2013 (UNCEEAA, 2013). A key element of the System of Environmental-Economic Accounting (SEEA) implementation strategy is to allow for a flexible and modular approach: rather than proposing a 'one-size-fits-all approach', it takes as its point of departure the recognition that countries differ in terms of their specific environmental-economic policy issues and their level of statistical development. Accordingly, countries may prioritise the accounts they want to implement over the short to medium-term based on the most pressing policy demands.

3. The aim of this paper is to identify some important success factors for the SEEA-CF implementation process based on the experience of Statistics Netherlands. Statistics Netherlands has been actively involved in the compilation of environmental accounts for a long time. The lessons it has learned in the past twenty years may be of use for the implementation process in other countries. First, we provide a general overview of SEEA-CF implementation in the Netherlands. Next, we identify the key drivers for implementation and address the role of data availability for the compilation of the accounts and institutional infrastructure. Lastly, we describe two examples of accounts that were implemented directly as a result of national policy demand.

II. Overview of the implementation of the System of Environmental-Economic Accounting in the Netherlands

4. Statistics Netherlands has a long tradition of environmental accounting (de Haan, 2004; Schenau et al., 2010). As early as in 1991, an illustrative National accounting matrix including environmental accounts (NAMEA) was presented. The original design contained a complete system of national flow accounts, including a full set of income distribution and use accounts, accumulation accounts and changes in balance sheet accounts. Statistics Netherlands has gradually expanded the Dutch system of environmental accounts. Table 1 gives an overview of which SEEA-CF accounts have been implemented in the Netherlands and which have not (see also Statistics Netherlands, 2012a).

Table 1
**Overview of the System of Environmental-Economic Accounting Central Framework
 accounts implemented in the Netherlands**

	Implemented	Under development	Not implemented	Year of implementation
Physical flow accounts				
Physical supply and use tables for products		X		
Economy wide material flow accounts	X			2010
Physical flow accounts for energy	X			2006
Physical flow accounts for water	X			2007
Air emission accounts	X			1998
Water emission accounts	X			2003
Waste accounts	X			2006
Monetary activity accounts				
Environmental protection expenditure accounts (EPEA)	X	X		1990s
Resource management expenditure accounts (RUMEA)		X		
Environmental goods and services sector (EGSS)	X			2010
Environmental taxes	X			2006
Environmental subsidies and similar transfers		X		
Emission permits	X			2010
Transactions concerning fixed assets			X	
Asset accounts				
Minerals and energy	X			2007
Land (forest)			X	
Soil resources			X	
Timber resources			X	
Aquatic resources			X	
Other biological resources			X	
Water resources		X		

A. Physical flow accounts

5. Physical flow accounts show the origin and destination of materials in the economy and/or the environment, in a similar way to the supply and use tables of the National Accounts. They take into account three types of material flows: natural inputs, products, and residuals. Statistics Netherlands has implemented almost all physical flow accounts described in the SEEA-CF. In the 1980's and 1990's the main environmental problems for the Netherlands were focused on environmental problems related to eutrophication, acidification and waste production. Accordingly, the focus was initially on the development of accounts for residuals, such as air emission accounts, water emission accounts and waste accounts. In later years, flow accounts for resources, such as energy, water and materials were developed. Recently, a pilot study was done to construct full physical supply and use tables for all materials.

B. Environmental activity accounts

6. In these accounts, all economic transactions within the National Accounts with an environmental aspect are identified. Work on environmental protection expenditure has been on-going since the 1990s, although the full set of tables for the Environmental Protection Expenditure Account (EPEA) and the Resource Use and Management Expenditure Accounts (RUMEA) have not yet been implemented. Accounts for the Environmental goods and service sector (EGSS), environmental taxes and emission permits have been implemented since 2006.

C. Asset accounts

7. Asset accounts describe the natural resources that are important as input for economic production. They show the opening and closing stocks and the changes that occur within the accounting period. These assets are accounted for in both physical and monetary terms. At the moment, Statistics Netherlands only compiles physical and monetary balance sheets for oil and gas reserves. Asset accounts are less developed, primarily because - apart from natural gas and oil reserves - the Netherlands has relatively few natural resources.

III. Key drivers for implementation

8. As far as possible, implementation of the SEEA-CF should be a demand-driven process. Accordingly, accounts that address the most pressing policy needs should be developed first. In this section we identify the main drivers for SEEA implementation in the Netherlands.

A. European legislation

9. At European level, work on environmental accounting has been on-going for the last twenty years. Eurostat has played a very important role in this process by developing compilation guides and collecting data through questionnaires for different environmental accounts. Until 2013, response to these questionnaires was voluntary. In July 2011 the European Parliament and Council adopted the first European Union (EU) Regulation (and law) on environmental accounts which requires all Member States to compile annual data for three modules in a first stage (first data delivery at the end of 2013). The legal basis contains three modules to which countries within the European Economic Area are required to conform. These modules are Air emission accounts, Environment-related taxes by industry, and Economy-wide material flow accounts. An extension of the legal basis with regard to energy flow accounts, the Environmental Goods and Services Sector (EGSS), and environmental protection expenditure is being discussed within the European Commission and with the national statistical institute (NSIs). On the European level, data from the environmental accounts have been used for several policy areas, such as climate change, taxation, reduction of the use of natural resources etc. The European legislation and the work by Eurostat have been important drivers for the implementation process of SEEA in the Netherlands and other EU member states.

B. National policy demand

10. A second important driver for the development of the Dutch environmental accounts is a direct and well-articulated demand from national policy and decision makers. Some

specific accounts have been developed on request by the Ministry of Economic Affairs and the Ministry of Environment and Infrastructure. Two important examples, the Dutch water accounts and the economic radar of the sustainable energy sector, will be discussed in more detail in section VI. The interest and involvement of policymakers has helped enormously to focus the research programme and also created extra capacity for further research.

C. Research programme for sustainable development and green growth

11. Sustainable development and, more recently, green growth are two themes that have received much attention both at a national and an international level. Since 2009, Statistics Netherlands has been working on a special research programme for these themes, which has also contributed to the development of several environmental accounts (emission permits, carbon footprint, etc.). Once implemented these data were used widely by policymakers, private companies and the general public.

IV. Implementation and data requirements

12. In essence, compiling environmental accounts is about integrating various data sources such as environmental statistics, energy statistics and economic statistics. An important condition for the compilation of environmental accounts is thus the availability of good basic data. Data collection is costly in terms of human resources but also in terms of response burden. The data requirements of environmental accounts need to be carefully considered as NSIs face budget restrictions and constraints in terms of response burden.

13. In the Netherlands, these data are available and accessible. For the greater part, they are available from databases from within Statistics Netherlands, while some originate from external sources. Good and close cooperation with the relevant external parties is therefore essential for the compilation of the different accounts. It is important to note that with one exception (a survey for environmental expenditure for companies), the Dutch environmental accounts did not require any additional surveys and thus did not raise the administrative burden. Data availability was an important prerequisite for the implementation of the Dutch environmental accounts. Table 2 lists the main data sources used to compile the Dutch environmental accounts.

Table 2

Main data sources for the Dutch environmental accounts

Physical flow accounts

Physical supply and use tables for products	National accounts, International trade statistics, etc.
Economy wide material flow accounts	National accounts, International trade statistics, etc.
Physical flow accounts for energy	Energy balances, traffic statistics, etc.
Physical flow accounts for water	Environment reports database, data from water companies
Air emission accounts	National emission inventory, traffic statistics, etc.
Water emission accounts	National emission inventory
Waste accounts	National database for waste, National accounts, etc.

Monetary activity accounts

Environmental protection expenditure accounts	Business survey on EPE, government statistics, etc.
Resource management expenditure accounts	
Environmental goods and services sector	National accounts, production statistics, etc.
Environmental taxes	National accounts
Environmental subsidies and similar transfers	National accounts, government databases
Emission permits	Database from the national emission authority

Asset accounts

Minerals and energy	National accounts, report on oil and gas reserves
Land	
Soil resources	
Timber resources	
Aquatic resources	
Water resources	

V. Institutional infrastructure

14. In the Netherlands one institution (Statistics Netherlands) is responsible for the compilation and publication of the environmental accounts. However, it is very important that it is in frequent and direct contact with policymakers of the relevant ministries and with national research institutes. This is put into practice by frequent meetings with stakeholders, but also by giving presentations of new data when they become available. In this regard it is important to have a clear dissemination strategy to inform all relevant parties. In the Netherlands the environmental accounts are disseminated in an annual publication (Statistics Netherlands, 2012a), via a special dedicated webpage, in the electronic database of Statistics Netherlands (StatLine), and in various other publications of Statistics Netherlands. An example of making the environmental accounts more accessible to the general public is the personal footprint calculator, an interactive tool on the website of Statistics Netherlands that allows individuals to calculate their direct and indirect CO₂-emissions (Figure 1).

Figure 1

Interactive tool for the calculation of the personal carbon footprint



15. Within Statistics Netherlands, the environmental accounts are compiled at the National Accounts department. This has several key advantages. First, knowledge of the System of National Accounts (SNA) concepts is very important for the compilation of the environmental accounts and the analyses of the data. Within the National Accounts department, the same staff work on both types of accounts. This also contributes to full consistency between the national accounts and environmental accounts data. Secondly, national accounts are an important source for the compilation of the environmental accounts. Direct access and knowledge of these data facilitate the work process. Thirdly, data from the environmental accounts may directly contribute to the improvement of national accounts. For example, physical flow accounts for energy are used to improve volume estimates in the monetary supply and use tables. However, this arrangement requires a good harmonisation of activities and communication with other departments within Statistics Netherlands where the main source statistics are produced.

VI. Examples of policy-driven implementation

A. Dutch water accounts

16. For a number of years now, the demand for information on the economic value of water and the wider economic consequences of water policy and management has been increasing rapidly. In Europe, the introduction of the European Water Framework Directive (WFD) was an important impulse for this demand. This Directive is one of the first European directives in the domain of water, which explicitly acknowledges the important role of economics in water policy and management. In order to meet this growing demand, Statistics Netherlands has developed an integrated water economics information system called the National Accounting Matrix including Water Accounts (NAMWA).

17. Following a pilot project in 1997, the Dutch system of environmental accounts was expanded in 2002 with the water accounts. Statistics Netherlands and the Ministry of Environment and Infrastructure have been working together on the development of a new integrated river basin information system since 1997. One important characteristic of the Dutch water accounts is that they present information at the level of the seven main river basin districts in the Netherlands: Meuse, Scheldt, Ems, Rhine-North, Rhine-West, Rhine-East and Rhine-Centre. The Dutch water accounts consist of the following components:

- (a) Physical flow accounts for water use (tap water, groundwater, surface water);
- (b) Economic accounts for river basins;
- (c) Water emissions accounts for nutrients, heavy metals and other pollutants;
- (d) Assessment of available fresh water resources (stocks) for a single year (2009).

18. The Dutch national water emission accounts are published annually by Statistics Netherlands.

19. By linking water and substance flows to economic flows systematically for a number of years, insight is gained into the nature of the relationships between our physical water systems and the economy. The integration of physical and economic information also allows the construction of integrated indicators. For instance, water use by various economic sectors can be related to the economic interests concerned. Integration of water and economy at river basin level makes the water accounts an important information tool to support policy and decision making in the field of integrated water management as advocated by the Water Framework Directive (Van Rossum and Van de Grift, 2009). The water accounts have been directly used by the Ministry for Infrastructure and Environment for reporting to the Water Framework Directive.

B. Economic radar of the sustainable energy sector in the Netherlands

20. In 2011, Statistics Netherlands published its first *Economic radar of the Sustainable energy sector in the Netherlands*. This monitor of the sustainable energy sector was commissioned by the Ministry of Economic Affairs. The sustainable energy sector is part of the Environmental Goods and Service Sector (EGSS). Accordingly, concepts, definitions and classifications coincide directly with those in the SEEA-CF. The sustainable energy sector comprises companies active in the production of renewable energy as well as companies active in value chains preceding the operational phase, such as the production of renewable energy systems, research and development focusing on sustainable energy technologies, transport of wind turbines and trade in biomass. It also includes companies and institutions active in energy saving.

20. The relevance of monitoring the sustainable energy sector lies in evaluating economic opportunities of the Netherlands in the global transition towards a renewable energy supply system and more attention for energy conservation. Due to several geopolitical, economic and environmental developments policymaking focused on promoting energy transition in the Netherlands, including imports dependency, decreasing national energy reserves, climate change, and energy transformation and new economic opportunities.

21. Table 3 provides a summary of the main results (Statistics Netherlands, 2012b). The sustainable energy sector accounted for 17.400 full-time equivalent units (FTE) in 2010, which is 0.26 per cent of total employment. The share in gross domestic product is slightly larger, 0.31 per cent in 2009. This share has also grown over time. The indicators share in employment (FTE) and share in gross domestic product (GDP) are potential indicators for the green growth framework.

22. Although the Economic radar of the Sustainable energy sector is quite new, it is successful in the sense that its data are widely used by policymakers and private companies, and that there have been additional data demands, for example for data at a regional level.

Table 3

Key figures for the sustainable energy sector, 2008-2010

	2008	2009	2010
<i>absolute values</i>			
Employment ¹ (FTE, rounded)	16.000	16.700	17.400
Production (mln euro, rounded)	5.160	4.800	na
Value added (mln euro, rounded)	1.710	1.750	na
Import of goods (mln euro, rounded)	2.232	2.300	na
Export of goods (mln euro, rounded)	1.806	2.200	na
Gross capital formation:			
Demand side exploitation phase (mln euro, rounded) ²	1.400	870	1.190
Investments pre-exploitation phase	234	261	na
Innovation (R&D expenditures per euro turnover ³ , %)	2,0	na	2,4
¹ Includes only employees on the payroll of SES companies. Employees hired from temp. agencies are not included			
² Includes only projects reported to the EIA scheme, based on financial reports by A-NL			
³ . This figure includes only companies of ten or more employees. Figures only representative for medium-sized and large companies			

VII. Conclusions

23. In the last twenty years, Statistics Netherlands has implemented a large part of the SEEA Central Framework. Based on this experience, several success factors for the implementation process can be identified:

(a) Implementation of environmental accounts benefits from a clear demand for these data. In the Netherlands, demand at the European level (legislation) and demand for national environmental-economic policies were the main drivers for implementation. It is advisable not to develop and implement accounts for which there is no clear policy demand;

(b) When human resources are limited, focus the implementation on only one or two accounts instead of starting and spreading the work over several different kinds of accounts;

(c) The availability of reliable source data, such as a national emissions inventory or detailed energy balance sheets, is an important prerequisite for compiling environmental accounts. It is advisable to start by compiling accounts for which reliable data sources are readily available;

(d) Good communication between the NSI and other national institutions, such as the relevant ministries and research agencies, is very important, both to identify key policy demands and to ensure the availability of and identify possible changes in external data sources;

(e) The compilation of environmental accounts within the department of National accounts offers important advantages, as knowledge of the concepts of the SNA and direct access to its data contribute to an efficient work process and good data quality.

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