From **Statistics** To **Policy**

The development and application of environmental statistics and environmental accounts in the Netherlands

Policy Study

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The development and application of
environmental statistics and
environmental accounts in
the Netherlands

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'Wealth Accounting and the Valuation of Ecosystem Services' (WAVES).

PBL Netherlands Environmental Assessment Agency is the national institute for strategic policy analysis in the fields of the environment, nature and spatial planning. We contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount. Policy relevance is the prime concern in all of our studies. We conduct solicited and unsolicited research that is both independent and scientifically sound.

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Summary and Findings

How environmental accounting can contribute to better policy

High-quality information on the value of natural capital and ecosystem services can contribute to improved political decision-making and to policies that guide sustainable development. This is the idea behind the World Bank's WAVES programme, supported among others by the Dutch Government. WAVES stands for 'Wealth Accounting and the Valuation of Ecosystem Services'. This information can be structured in the form of 'natural capital accounting' (NCA), with which many countries are currently experimenting.

NCA is the integration of economics and natural capital through the system of national accounts. This system is applied by national statistics offices, such as Statistics Netherlands (CBS), to compile, monitor and publish economic data according to international standards. The WAVES programme has contributed to the development of NCA in multiple countries, while natural capital accounts have been established for woodland and water in several countries. Now, increasingly, attention is raised towards the question of how this information can actually contribute to improve policy-making.

The Netherlands has nearly 50 years of experience in systematically collecting and reporting on environmental statistics, and over 20 years of experience in the development of environmental accounts as a satellite account to the system of national accounts. Experiences in the ways in which this information has been used in shaping, substantiating and evaluating Dutch policy on the environment, nature and spatial planning can inspire WAVES partner countries that intend or consider to establish an NCA system. These experiences concern insights into the interaction between 'supply and demand' of environmental statistics and accounts. Who are the users? Does the information provided meet their needs? How is the information applied and interpreted? Do the users exert any influence on which statistics or accounts are developed? And which lessons can be drawn from experiences in the Netherlands?

This report provides an initial attempt to answer these questions by examining the development of environmental statistics and environmental accounts in the Netherlands, and their use in policy-making, since the early 1970s. Emphasis is put primarily on the interaction between those who produce the environmental accounts and statistics, the intermediaries, and the final use of these statistics in decision-making.

Development of the environmental accounts in the Netherlands

The Netherlands, at the end of the 1960s, was one of the first countries that introduced 'environment' as an independent theme in official statistics. Initially, the focus was largely on statistics that described environmental pressures such as emissions to air and surface water and waste production. The Netherlands Pollutant Release and Transfer Register, set up in 1974, played an important role in the production of these statistics. This was followed by additional environmental statistics in other domains during the 1970s. The National Accounting Matrix including Environmental Accounts (NAMEA) was developed in the early 1990s and was initially based on the main environmental themes of the first and second National Environmental Policy Plans (NEPP) (climate change, depletion of the ozone layer, acidification, overfertilisation and waste) and also included an indicator for developments in proven oil and gas reserves.

The environmental accounting system in the Netherlands continued to develop steadily after the initial phase. In recent years in particular, a significant expansion took place with support from Eurostat. The relationship between the environment and the economy rises on national and international policy agendas as climate

change, biodiversity loss and the increasing scarcity of raw materials result in an increased political focus on sustainability and green growth. The EU published a strategy for environmental accounts in 2003, followed by a directive in 2011. The UN subsequently adopted an international statistics standard for environmental accounting (*the System of Environmental and Economic Accounting 2012 – Central Framework (SEEA CF)*, published in 2014). In 2014 and 2015, the Netherlands experimented with pilot projects on natural capital accounts.

From statistics to policy

The development of environmental statistics in the Netherlands involves, along Statistics Netherlands (CBS), various other organisations, such as Alterra, the National Institute for Public Health and the Environment (RIVM) and Rijkswaterstaat (the Dutch Government's executive agency for public works and water management). Statistical data are also provided by companies (subjected to surveys by Statistics Netherlands), NGOs, and volunteer networks (e.g. in ecological monitoring networks for species and biodiversity).

The CBS multiannual statistical programme is being developed by the independent Central Commission for Statistics (CCS). User consultation currently takes place through several advisory bodies and 'account teams' and through regular consultation between CBS environmental statisticians and representatives from government ministries and research institutes. When deciding to initiate, maintain or discontinue statistical series, the long term matters; a series' value increases over time, if it is regularly updated, as this allows for longer trend analyses. A time series may not be used for a long time and then suddenly become politically relevant. At times, this may create somewhat of a disconnect between longer existing environmental account series and more recent political themes.

Statistical environmental information is communicated through various channels. These days, environmental statistics information is mainly published online. The main channels are the Environmental Data Compendium and the CBS StatLine database. Increasingly, data are published in combination with their context, interpretation and explanation, in addition to the 'pure statistics'. Statistical data often form the basis for indicators that can be compared with standards or policy objectives.

The information contained in environmental statistics and environmental accounts can be used in various phases of the policy cycle:
– Awareness-raising, agenda-setting and prioritisation of environmental issues;

– Substantiating and supporting policy development;
– Policy monitoring, evaluation and adjustment;

In addition, there are three other applications in which this information is regularly used:
– In estimating the size and distribution of environmental costs and benefits;
– When making international comparisons and obligations;
– In research (not directly policy-related).

Policymakers and other users of environmental statistics often have a need for 'processed' information rather than for 'raw' data, in other words context, interpretation and explanation, as mentioned above. This often requires data to be simplified, assumptions and norms to be made and models to be applied; in other words, the processing of the statistical raw material. In the Netherlands, such processing is usually carried out by 'intermediaries' – the assessment agencies se (PBL, CPB), research institutes such as ECN and, increasingly, CBS itself.

Recommendations

Over time, a high degree of cooperation and a clear division of tasks has developed between CBS and other actors in the Netherlands with regard to the collection, publication and interpretation of environmental information. Three characteristics of the system that have developed over time may serve as inspiration for the WAVES programme:
– It is recommended to ensure consultation and cooperation between the developers and the users of environmental accounts regarding choices of themes and the development of new statistics and accounts. Attention for the long term is an important part of this, as is seeking partnerships with other organisations that may be able to provide data or assistance.
  The statistical office remains responsible for statistical accuracy, reliability, security and data-linking.
– The translation of raw data into policy-relevant information is essential for making maximum use of environmental statistics and accounts. This task must be clearly allocated, if WAVES wants to improve the application of environmental data in policy-making. This translation is required to reduce the gap between environmental statistics/accounts and policy, and often requires other expertise and research qualifications than those needed in statistics development. Experience in policy evaluation, modelling and policy instruments are examples. The key condition is that it should always be clear and transparent on which assumptions and methods this translation or processing step is based.

– The use of different channels to link statistics and policy increases the scope of application and the reach of environmental statistics and accounts. This can be done by statistical offices, by government agencies specifically tasked with policy analysis, by non-governmental organisations and universities, and by think tanks and consultancy firms. The Environmental Data Compendium, produced by a partnership between several institutes, provides online, open-access data on the environment, nature and spatial planning, in such a way as to make social and political debate possible – for example, by combining environmental statistics with policy objectives. National environmental reporting obligations are also in place in the Netherlands. Past examples include the annual Environmental Balance Reports in support of the National Environmental Programme, and the four-yearly Environmental Outlooks. Since 2010, biennial Assessments of the Human Environment have been published. On an international level, environmental statistics are being linked to policy by, for example, the European Environment Agency, UN agencies, development banks and the OECD.

We would also like to emphasise that this report does not advocate that other countries copy the Dutch model. The three recommendations may provide direction for the countries that, together with WAVES, intend to strengthen the link between environmental statistics and policy-making. However, compared with the situation in the Netherlands, available resources may be more limited in the development and transition countries in which WAVES is active; all the more so, given that environmental accounts in those countries still have to prove their usefulness and added value for the policy cycle. It is also entirely possible that there are good opportunities for further improving the system, also in the Netherlands. WAVES, in this light, could look for ways to use the above recommendations which are based on the experiences in the Netherlands – the use of consultation and partnerships and a long term perspective, the interpretation and analysis as a separate task, and the use of different channels – while creating a more efficient way of shaping the application of environmental accounts in its partner countries.

Looking ahead

This report shows that the interplay between the development and communication of environmental statistics and accounts on the one hand, and their interpretation and policy-relevant analysis on the other, is highly developed in the Netherlands. Maybe this is best appreciated by asking ourselves which information would be unavailable if not for this system, and what information would be used instead to base environmental policy on? At the same time, it would be worthwhile to evaluate the Dutch system as a whole together with the people who are most involved in it. This report could serve as a starting point in that debate.

FULL RESULTS

Introduction

1.1 Background and objective of this report

PBL Netherlands Environmental Assessment Agency was asked by the Dutch Ministry of Foreign Affairs to support the WAVES Global Partnership of the World Bank. WAVES stands for 'Wealth Accounting and the Valuation of Ecosystem Services'. The idea behind WAVES is that high-quality information on the value of natural capital and ecosystem services can contribute to decision-making and sustainable development policy. This information can be provided in the form of 'natural capital accounting' (NCA) with which many countries are currently experimenting.

In the 'core implementation countries'[1], the WAVES programme focuses primarily on the development of a number of environmental accounts. Selection of the accounts differs between countries and is based on consultation with ministries and policymakers. The aim of the environmental account modules developed is that they contribute to a better, more broadly informed policy development process. A key question for WAVES, therefore, is *how* can this information actually contribute to improving policy?

The Netherlands has almost 50 years of experience in the systematic collection of and reporting on environmental statistics, and over 20 years of experience in producing environmental accounts as part of the system of national accounts. This experience can help WAVES partner countries that wish to implement an NCA system, or are considering doing so. The WAVES programme, therefore, asked Statistics Netherlands (CBS) to provide support and training in various countries that are setting up their first environmental account modules. Ministries and policymakers are to become involved early on in the process. It is important to obtain an idea of the interaction between 'supply and demand' in environmental statistics and accounts. Who are

the users? Does the information provided meet their needs? How is the information used? Do the users have any influence on the statistics and accounts produced? And which lessons can be drawn from experiences in the Netherlands?

This report attempts to answer these questions by examining the development of environmental statistics and environmental accounts in the Netherlands and their use (in agenda-setting and in informing, developing, implementing, evaluating and improving national policy) since the early 1970s. The focus is primarily on the interaction between the producers/providers and the users of environmental statistics.

1.2 Definition and scope

The UN defines the scope of environmental statistics as 'biophysical aspects of the environment[2] and those aspects of the socio-economic system that directly influence and interact with the environment' (UNSD, 2016, p. 22). The scope of environmental statistics, therefore, overlaps with that of economic and social statistics. For example, whenever economic statistics describe processes or activities that have a direct influence on or interaction with the environment, they also fall within the domain of environmental statistics. Environmental accounts provide a link between national accounts and environmental statistics. They contain physical and monetary information on the environment and are structured in such a way that they align with the concepts, definitions and classifications used in the national account system. Environmental accounts, therefore, cover the area where environmental and economic statistics overlap.

A distinction is made between these three types of quantitative environmental information: environmental data, environmental statistics and environmental indicators. Environmental statistics 'are environmental

Figure 1.1
The environmental information pyramid

Society

Policymakers

Policymakers and researchers

Researchers and competent authorities

Researchers

Images

Integrated policy studies

Indicators

Registers and databases

Monitoring and research data
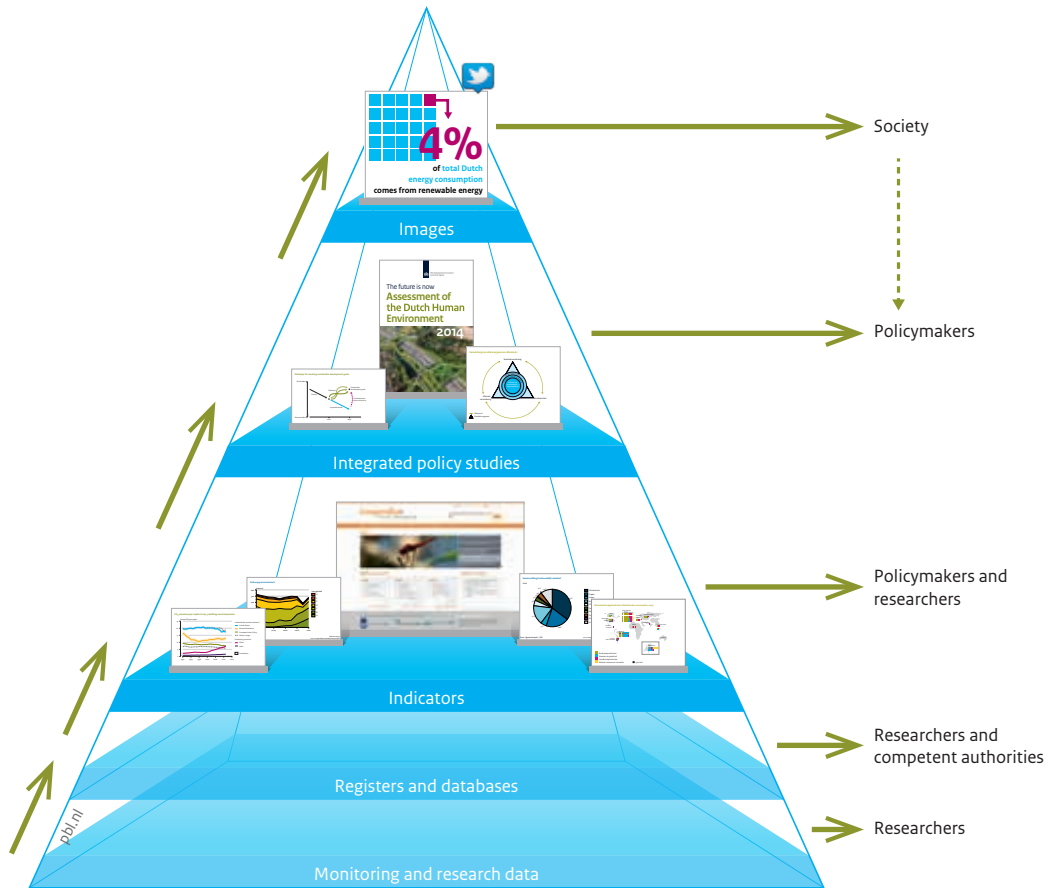
Source: PBL

data that have been structured, synthesised and aggregated according to statistical methods, standards and procedures. The role of environment statistics is to process environmental and other data into meaningful statistics that describe the state of and trends in the environment and the main processes affecting them' (UNSD, 2016, p. 23). In turn, environmental indicators are used to summarise, simplify and present environmental statistics.[3] Together with other information, the data, statistics and indicators form the base of the 'information pyramid' for environmental policy (Figure 1.1).

There is no internationally-agreed, global standard for the compilation of environmental statistics. However, such standards have been implemented in some areas, in particular by the United Nations Economic Commission for Europe (UNECE). These are used, for example, by the OECD and Eurostat and also, in an adapted form, in the System of Environmental-Economic Accounting – Central Framework (SEEA CF) (UN, 2014). The following six components of environmental statistics are distinguished

in the Framework for the Development of Environment Statistics (FDES), which was introduced in 1984 and has been recently revised (UNSD, 2016, p. 45):
– environmental conditions and quality;
– environmental resources and their use;
– residuals (waste and emissions);
– extreme events and disasters;
– human settlements and environmental health;
– environmental protection, management and engagement.
Environmental statistics, therefore, cover a broad field of topics and also include, to some extent, economic and social statistics.

In the Netherlands, environmental statistics are produced not just by CBS, but also by other institutes such as Rijkswaterstaat Environment (waste data) and RIVM (the Netherlands Pollutant Release and Transfer Register; national air, soil and groundwater quality monitoring networks). Non-governmental organisations also contribute to the compilation of environmental

statistics, in particular in species and biodiversity monitoring networks. The observations and records of volunteers play an important role in this.[4] In this report, we limit ourselves primarily to CBS environmental statistics, because it is CBS that produces the environmental accounts (Section 2.2) that are most relevant to the WAVES programme. Furthermore, we also focus mainly on the national level. The term 'environment' encompasses the environment in a broad sense (therefore, also nature and biodiversity, for example, although these fall under a different ministry than the environment in Dutch national policy).

1.3   Structure of the report

Chapter 2 outlines the developments in environmental statistics (Section 2.1) and environmental accounts (Section 2.2), from 1969 onwards, in the Netherlands and Europe. A number of illustrative cases and themes are also described in text boxes. In Section 2.3, we take stock; what is the current state of affairs and what are the most important issues? Chapter 3 provides an overview of the various uses of environmental statistics. Chapter 4 contains final conclusions with regard to the WAVES programme; what do experiences in the Netherlands mean for countries in which environmental statistics and environmental accounts – and the application of this information in policy – have had less time to develop? The research is based on literature research and interviews. The names of the interviewees are listed in Appendix 1.

Notes

1   These are: Botswana, Colombia, Costa Rica, the Philippines, Guatemala, Indonesia, Madagascar and Rwanda. See www.wavespartnership.org.

2.   The 'environment' refers to the 'biophysical, biotic and abiotic surroundings in which humans live' (UNSD, 2015, p. 46).

3.   An early example of the use of environmental indicators in Dutch environmental policy can be found in Adriaanse (1992). These indicators reflect the themes identified in Dutch environmental policy in the 1990s (climate change, ozone depletion, acidification, overfertilisation, pollution, waste and disruption).

4.   The pioneering work of CBS in the development of the TRIM programme should also be mentioned. This programme is used worldwide to determine trends in species data.

The development of environmental statistics and environmental accounts

2.1 Environmental statistics

2.1.1 A brief history

The history of environmental statistics in the Netherlands goes back to the middle of the 1960s, when the Ministry of Social Affairs and Public Health decided to establish an environmental statistics department within CBS, with the remit to 'make precise calculations of the damaging side-effects of economic activities'[1]. By 1969, the establishment of an environment department within CBS was completed, as part of the Health Statistics Directorate (Natuurcijfers, 2015). CBS may have been the first agency in the world to compile environmental statistics (FD, 1998). The emphasis was initially on statistics that described environmental pressures, such as emissions to both air and surface water, and waste production (Dijkerman, 2010). The Netherlands Pollutant Release and Transfer Register, established in 1974 (text box), played an important role in providing data, and more and more different types of environmental statistics began to be produced during the 1970s, covering a wider and wider area. The importance of these statistics was reflected, organisationally, in the establishment of an environmental statistics division in 1974 (CBS, 1999).

An Environmental Statistics Advisory Commission was established in 1975 – one of the more than 20 sub-commissions that advised the Central Commission for Statistics (CCS). According to one interviewee, this advisory commission had a high level of influence on the content and communication of Dutch environmental statistics in the 1970s and 1980s. At the instigation of the Central Commission for Statistics, the advisory commissions were disbanded in 2004 when the new CBS Act (*Wet op het CBS*) came into force, with which CBS became an 'independent administrative body'. In their place, six broader thematic advisory councils were established to advise the CBS directors (CCS, 2005).[2]

CBS published its first General Environmental Statistics in 1973. This included data collected by CBS itself, as well as information from other sources. In the following years, General Environmental Statistics were first published either annually or biennially, and later less frequently. In 1994, the title was changed to Environmental Statistics of the Netherlands. In 1999, this was incorporated into the Environmental Data Compendium and the Nature Data Compendium (in 2009 merged with the Environmental Data Compendium), which, in addition to CBS, also involved RIVM (later PBL Netherlands Environmental Assessment Agency (formerly MNP)) and the former Agricultural Research Institutes (DLO) (later Wageningen University & Research (WUR)). Between 1984 and 2000, CBS also published the Quarterly Environmental Statistics (*Kwartaalbericht Milieustatistieken*). Reports relating to specific environmental statistics were also regularly produced. Currently, environmental statistics information is mainly being published online. Important channels are the Environmental Data Compendium and the CBS StatLine database, but CBS also produces thematic publications on various environmental topics.

Table 2.1 provides an impression of developments in environmental statistics published over the years, based on a number of topics included in the publications. This overview is limited to the period from 1973 to 2001. The reason for this is that it is no longer possible to make useful comparisons on the basis of publications, as, since the start of the Environmental Data Compendium in 2004, most information is published online only and data are being updated continually. Note that this table only provides an impression of developments for a particular topic over time, as the number of tables and figures are not proportional to the amount of information they contain.

The Netherlands has fulfilled a pioneering role as far as environmental statistics are concerned. As the

The Netherlands Pollutant Release and Transfer Register[3]

The Netherlands Pollutant Release and Transfer Register was established in 1974. At that time, the Netherlands faced a multitude of environmental problems. For many of those problems caused by pollutants in the soil, water and air, policy principles such as 'the polluter pays' and 'reduction at the source' were not directly translatable into policy measures. The decision was made to develop an integrated system that allowed emissions to every compartment (air, soil and water) to be mapped, to encourage more focused environmental policy and to allow monitoring of its results.

The pollutants in each compartment were identified with respect to the nature and seriousness of the environmental problems, the sources and the location of the sources. The dimension 'time' was later added to allow a focus on trends. This resulted in the Pollutant Release and Transfer Register as we now know it, in which emission data are stored in a central database according to these five dimensions: pollutant, source, compartment, location/destination and time.

The goal of the register is to produce an agreed, annual data set of clear emission data that meets the following criteria: up-to-date, accurate, transparent, complete, comparable, consistent and accurate. Storage of this data in a central emission database enables the Netherlands to meet all national and international emission data reporting obligations in an efficient and effective manner. The Pollutant Release and Transfer Register is commissioned by the Dutch Ministry of Infrastructure and the Environment, and RIVM is responsible for management of the Pollutant Release and Transfer Register.

government noted as early as 1975, 'The Environmental Statistics department at CBS has, with the publication of the General Environmental Statistics 1973 and other analytical publications, drawn attention not just in the Netherlands but also in the rest of the European Community.'[4] The CBS Environmental Statistics were still considered to be leading in the 1990s (NRC, 1993). The CBS multiannual programmes, established by the Central Commission for Statistics, describe which statistics are to be compiled in the coming five years and which are to be discontinued. If there is an intention to discontinue certain statistics this is done in consultation with the main users and an attempt is made in the final selection to minimise the societal consequences (CBS, 2013a).

European environmental statistics have a shorter history. Not until in 1990 did Eurostat, the statistical office of the EU, begin to publish a series of environmental statistics. The reason for this was the entry into force of the Single European Act, which explicitly expanded the scope of the former European Community to include environmental policy.[5] A specific multiannual programme for environmental statistics entered into force in 1994.[6] In this, a direct link was made with policy; the statistics should 'contribute to the development of information for Community environmental policy and the relationship of this with other policy areas of the Community'. One of the priorities named in this programme was the development of satellite accounts for the environment and the linking of these to the national accounts (also see Section 2.2). The importance of cooperation with the recently

established European Environment Agency was also highlighted. Environmental statistics have been incorporated into the general statistics programme of the EU since 1998. The current multiannual programme (2013–2017)[7] focuses, as far as the environment is concerned, primarily on environmental accounts and climate change statistics.

2.1.2 Spending cuts

Following a long period of growth, CBS entered a period of budget reductions in the 1980s. A round of budget cuts was implemented at the end of the 1980s, and it could not be avoided that several CBS statistics would need to be discontinued. An attempt was however made to limit the loss of statistical information for users by taking into account the availability of alternative data sources either within or outside CBS[8]. Another 325 jobs needed to be cut in 1992–1993, as well as a 6% budget reduction for the environmental statistics (GPD, 1992).

In October 2003, a further loss of 400 jobs at CBS was announced over the period 2004 to 2007 (NRC, 2003). To achieve this, a proposal was made for significant reductions in the work programme. This was to include the discontinuation of non-statutory statistics that were relatively expensive to produce because they required CBS itself to collect data. This was to include nature and environmental statistics.

Many users of the threatened statistics, including RIVM, the assessment agencies and the former Ministry of Agriculture, Nature and Food Quality (LNV), the former Ministry of Housing, Spatial Planning and the

Table 2.1

Topics in the 'Environmental Statistics' and 'Environmental Data Compendium' publications, 1973–2001

Topic	GES 73	GES 74	GES 75-76	GES 77-78	GES 79-82	GES 83-85	GES 89	GES 92	ES 94	ES 96	EC 99	EC 01
Energy production/use/savings	6	6	5	10	9	9	6	9	9	9	13	14
Water production and use	2	5	4	6	2	7	4	4	4	5	7	9
Raw materials, waste and recycling	5	10	13	15	18	30	20	25	25	28	30	25
Production/use of hazardous substances*	0	0	0	9	16	19	19	10	5	8	5	2
Manure production and surpluses	3	14	14	14	14	11	16	12	17	19	11	13
Discharge/emissions to water	7	8	6	4	5	7	6	3	2	2	10	14
Surface water quality**	7	19	17	11	10	15	8	13	8	7	10	11
Water treatment	3	3	5	3	6	13	7	8	2	3	3	1
Emissions to air***	5	6	12	13	7	5	3	4	3	5	19	22
Air quality	21	30	17	11	12	12	6	5	5	2	8	13
Greenhouse gases, climate change	0	0	0	0	0	0	0	0	0	4	20	19
Soil and groundwater quality	0	0	0	5	6	13	12	19	15	11	18	18
Noise and odours	0	0	4	2	3	4	7	8	8	6	14	14
Radioactive materials/radiation	8	7	6	6	9	12	6	5	3	3	9	10
Contamination of fish and food****	4	14	16	16	19	21	11	13	8	6	3	3
Area/extent of woodland and nature	6	6	4	5	4	5	7	5	3	3	7	5
Species number and distribution#	19	10	12	17	24	25	28	20	16	25	7	10
Environmental investments, costs and taxes	1	6	8	11	10	14	17	23	27	27	19	15

G)ES = (General) Environmental Statistics; EC = Environmental Data Compendium. The numbers represent the number of tables and figures relating to the topic concerned. Darker boxes correspond to higher numbers.

* Including pesticides.

** Including the North Sea.

*** Excluding tables/figures that specifically concern greenhouse gases.

**** Including drinking water.

Information on this topic was largely incorporated into the Nature Data Compendium after 1996.

Environmental costs statistics

CBS began compiling data on the environmental costs of enterprises in 1978 (the costs of environmental activities conducted by the enterprises themselves and monetary transfers (taxes and payments for contracted environmental activities)).

The data used in the statistics were compiled using an annual written questionnaire that is sent to enterprises in the mineral extraction, industrial and public utility sectors. Time series are available for the period 1985 to 2012. However, these statistics were discontinued in 2012 and replaced with 'enterprise environmental cost and investment' statistics. Statistics relating to 'ongoing' costs were no longer compiled from 2012 onwards. The ongoing costs of environmental investment were calculated up to and including 2011, and consisted of personnel costs for operation, maintenance and supervision; energy costs; the cost of raw materials and additives; and services provided by third parties, with a deduction for any revenue and savings. Additional costs on low-sulphur fuels was also calculated separately. Ongoing costs were no longer calculated from 2012 onwards because, according to CBS, it 'no longer has a useful and efficient method for producing reliable statistics' (source: http://cbs.overheidsdata.nl/82863NED, accessed on 24 September 2015). One of the interviewees claimed that another reason was the 'vulnerability' of the data processing process, and the wishes of Eurostat. The changes did result in greater efficiency although, according to the interviewee, this was not the primary reason for the changes.

Environmental statistics and manure surpluses

Warnings of manure surpluses, and of the potential serious consequences for the environment, were already being heard at the end of the 1960s in the Netherlands. Even so, a policy response was not found until about 15 years later, and only in 1984 were the first measures taken to do something about the problem. As a result, the Dutch Ministry of Agriculture was accused of negligence in a report by the Netherlands Court of Audit report (NRC, 1990).

One of the factors that played a role in the delay in the manure policy was the lack of statistical data on the extent of the manure surplus. CBS had carried out calculations in 1973, but these were not published, as no agreement could be reached on the results with agricultural experts.[9] The differences in opinion always concerned the standards that should be applied to determine the level of manure application above which a surplus can be said to exist. For many years, no agreement could be reached within the Dutch Environmental Statistics Advisory Committee on how CBS should publish the surpluses. National statistics on manure surpluses were published for the first time in 1982, and the first regional results a few years later (Van Maarseveen and Schreijnders, ed., 1999).

In 1990, Minister of Agriculture Gerrit Braks responded to parliamentary questions following publication of the article in the NRC newspaper referenced above: 'The course of events during the 1970s in the Central Commission for Statistics and its advisory bodies resulted in delays in the production of manure statistics. The problems presented by the representatives of the Ministry of Agriculture and Fisheries at that time added to this. As far as I can ascertain, these representatives presented valid arguments in the bodies concerned. [...] Nevertheless, I do – with the benefit of hindsight – understand that the actions of the Agriculture and Fisheries representatives were interpreted in that way.'[10] The Netherlands Court of Audit (1990, pp. 124–125) used slightly less cautious wording: 'The decision-making process in the Environmental Statistics Advisory Committee regarding the research proposals did not go smoothly, and the position taken by the representatives of the Ministry of Agriculture and Fisheries in the commission played an important role in this. The permissible standard for manure application to be used in the calculations formed a constant point of discussion. Even when the suggestion was made to produce calculations based on several different levels of manure application, the Ministry of Agriculture and Fisheries continued to object. An investigation by the Netherlands Court of Audit shows that the attitude taken by the Department representatives in the Environmental Statistics Advisory Committee was based mainly on the fact that the Ministry of Agriculture and Fisheries had no interest in calculations that revealed the existence of manure surpluses. [...] The conclusion can therefore be drawn that CBS could have come up with acceptable – if incomplete – surplus statistics as early as the second half of the 1970s. Such calculations, produced at an earlier stage, could have provided insight into developments in the manure problem and could have helped ensure a timelier intervention in these developments.'

What is striking in this case is not just the political pressure that caused publication of the CBS results to be delayed, but also the fact that the existence of manure surpluses could apparently only be shown convincingly if proved by CBS on the basis of manure application standards. After all, the extent of manure *production* had been known for much longer and had been published by CBS in the 1970s (Table 1).

Environment (VROM) and the former Ministry of Transport, Public Works and Water Management, submitted written protests to the proposed cutbacks. In December 2003, the House of Representatives unanimously adopted a motion, proposed by Member of Parliament Duyvendak, requesting the government to ensure that nature and environmental statistics would continue to be compiled. As it turned out, the government also supported the motion. According to Secretary of State Pieter van Geel, the CBS spending cuts in nature and environmental statistics would simply amount to juggling budgets and jobs, on top of which,

he said, the statistics were also required by Europe. Therefore, if CBS implemented cutbacks, other people would need to be employed elsewhere to compile the same statistics (Boerderij Vandaag, 2003).

Minister Laurens Jan Brinkhorst wrote to the House of Representatives: 'Users of CBS statistics now emphasise that relevant statistics must not be abandoned. Therefore, in my opinion, and based on my responsibility for statistical information, both the extent and period in time of the austerity package require further consideration. This, therefore, requires time for further consultation. With this in mind, I am therefore prepared

to defer a decision regarding the austerity package, under the condition that the preparations being made to discontinue the statistics relating to social conditions, culture and leisure and the environment/nature are also deferred' (Brinkhorst, 2003).

Although the environmental statistics survived this spending cut, certain statistics series have been and will be discontinued. For example, it was announced in the Strategic Multiannual Programme 2014–2018 (CBS, 2013a) that the statistics relating to environmental nuisance, behaviour and awareness among the general public are to be discontinued. The document provides no specific reason for this choice, although the cut is explained in general by a reduction in financial resources (the contribution from the Ministry of Economic Affairs to CBS will be reduced from EUR 186.9 million in 2012 to EUR 142.8 million in 2018).

Sometimes, external pressure results in a decision to continue certain statistics. One example (given in one of the interviews) is the statistics for gas consumption at the district level which, at the insistence of RIVM, are to be continued due to their importance in the Pollutant Release and Transfer Register. The remark was also made in the same interview that many environmental statistics are now 'safe' because they are required due to international obligations. Others pointed to the fact that 'sustainability' is now one of the key themes in CBS, which may also help ensure the continuation of environmental statistics. Even so, in practise, cuts are still being made to environmental statistics (also see the text box of 'Environmental costs statistics').

2.1.3   Context and interpretation of environmental statistics

Users of environmental statistics require information that makes it possible to relate 'raw data', such as the extent of, or trends in, certain emissions, to background factors, such as the size of polluting sectors, trends in society, technological developments and implemented policy. To provide this information, various publications are now produced that attempt to provide 'context and interpretation' for environmental statistics by analysing relationships and describing backgrounds. The earlier mentioned Environmental Data Compendium is one example of this. The emphasis in PBL's Environmental Balance reports, first published in 1995 (annually in the first years and now biennially as part of the PBL Assessment of the Human Environment), is on the relationship with policy. In the Sustainability Monitor for the Netherlands (a joint publication by CBS and the Dutch policy assessment agencies), the emphasis is on comparison with developments elsewhere in the world and the effects on future generations. The CBS

publication 'Green Growth in the Netherlands' presents indicators that provide a picture of the relationship between the environment and economic growth. These are indicators based on OECD's green growth indicators (OECD, 2014; Appendix 2).

The use of indicators is one way of making the many environmental statistics 'digestible' for policymakers and other users and of assessing developments over time. Many indicators relate to resource efficiency (the amount of energy and materials used to produce a certain good or used per unit of added value) or emission intensity (the amount of emissions and waste released per unit product or added value). Indicators based on environmental statistics are not only used in the general publications mentioned above, but also in many policy documents, reports, assessments, and so on in various fields. Popular indicators are the ecological footprints (such as carbon footprints and water footprints), which convey the total environmental effect of a package of products and services over the whole of the production chain, also outside the Netherlands. This work is based on input-output tables that are derived from the core CBS national accounts system.

Another way of improving the communicative effect of environmental statistics is to use infographics, which make the extent of certain environmentally-relevant quantities and indicators clear at a glance. A good example of this is the publication 'The Netherlands in 21 infographics' (PBL, 2012a).

2.2   Environmental accounts

2.2.1   Developments in the Netherlands

Dissatisfaction with Gross National Product (GNP) as a poor measure of welfare led to a wide range of suggestions for improvement. As far as developing a picture of the environmental losses associated with economic growth is concerned, two main schools of thought can be discerned. The first attempts to correct GNP (or national income) for these environmental losses ('Sustainable National Income' text box). The second school of thought concerns a system in which 'satellite accounts' are linked to the national accounts, thus enabling the quantification of various trade-offs between economic growth and the environment. CBS started working on such a system in the early 1990s. The result, the National Accounting Matrix including Environmental Accounts (NAMEA), was initially based on the following main environmental themes defined in the first and second National Environmental Policy Plans (NEPP): climate change, ozone depletion, acidification,

Table 2.2
Environmental accounts: situation early 2016

Physical supply and use accounts:
Waste balance; national accounts (waste accounts)
Emissions to air; national accounts (air emissions accounts)
Emissions to water, source-destination (water emissions accounts)
Energy consumption, enterprises and households (energy accounts)
Water consumption (water accounts)
Material flows; processing phase, continent

Stock accounts:
Petroleum and natural gas reserves

Monetary environmental accounts:
Environmental taxes and charges
Environmental sector
Environmental costs

Source: CBS.

overfertilisation and waste. NAMEA also included an indicator for developments in proven oil and gas reserves. The developers of NAMEA initially aimed to produce environmental indicators for each theme to relate the environmental pressure to the objectives of the NEPPs. However, the users (in the form of the National Accounts Advisory Council) were wary of mixing statistics and political objectives in this way (De Haan and Keuning, 1996).

CBS has continued to develop the environmental accounts system over the past two decades, with a rapid expansion in environmental accounts in recent years, in particular. The relationship between the environment and the economy is increasingly being placed on the national and international agenda. Examples are issues relating to climate change, biodiversity loss and the increasing scarcity of all kinds of raw materials, as well as interest in the themes of sustainability and green growth. The Dutch environmental accounts now cover a wide range of topics (Table 2.2). In addition to these, various pilot studies have also been carried out; for example, for compiling data on environmental subsidies, emission rights audits, and regional water accounts. One important reason for developing these environmental accounts is the demand for additional data by the national government (see the examples in the 'Environmental accounts' text box below). Since 2005, the results for the environmental accounts have been published as 'Environmental Accounts of the Netherlands' (CBS, 2014).

2.2.2 International developments
The Dutch NAMEA initiative soon found resonance at the international level. The first handbook for environmental accounts in the national accounts was published by the UN in 1993 (UN, 1993). A new version was published 10 years later, this time partly under the auspices of the

European Commission, the IMF, the OECD and the World Bank (UN et al., 2003). In February 2012, the United Nations Statistical Commission adopted the System of Environmental and Economic Accounting (SEEA) as the international statistical standard for environmental accounting (UN et al., 2014). CBS made an important contribution to this, in part as chairman of a UN working group (the London Group), which prepared the standard. SEEA is an internationally-agreed set of recommen-dations provided as concepts, definitions, classifications, accounting rules and tables for producing internationally comparable environmental accounts (CBS, 2013b). As an international standard, the SEEA has a status similar to the System of National Accounts (SNA). This means that major international organisations such as the UN (UNSD), OECD, World Bank, IMF and Eurostat base their work in this field on the SEEA.

For quite some time now, there has been an interest, at the EU level, in expanding the national accounts system to also include satellite accounts for the environment. As early as 1994, the European Commission published a Communication proposing NAMEA as an example for a European system of environmental accounts (EC, 1994). In 2003, an initial strategy for European environmental accounts was adopted by the heads of the statistical offices in the Member States, followed by a revised strategy in 2008 (Beyond GDP, 2014). This resulted in an EU regulation on European environmental-economic accounts, which entered into force in 2011 (691/2011). This regulation initially introduced three environmental-economic satellite account modules into the European accounts system:
– air emissions accounts (AEA);
– environmentally related taxes (ENV TAKS);
– material flow accounts (MFA).

Environmental accounts; examples of recent developments and applications

NAMWA (water accounts)

Commissioned by Rijkswaterstaat, work has been carried out in recent years on the NAMWA for river basins and the NAMWA North Sea. NAMWA means 'National Accounting Matrix including Water Accounts'. An economic description is provided of both the North Sea and the river basins, combined with data on emissions to water. Rijkswaterstaat uses these data to produce reports on the Water Framework Directive and the Marine Strategy Framework Directive.

Materials Monitor

The Materials Monitor was updated in 2015 at the request of the Ministry of Economic Affairs. This describes – in the form of physical supply and use tables – material flows to, from and within the Netherlands that are consistent with the national accounts. The Materials Monitor is now available for 2008, 2010 and 2012, and statistics on the supply and use of water have also been produced. The potential recovery of critical resources from waste water and sludge is also being investigated. The Materials Monitor was developed to support Dutch resource policy. Indicators can be derived from the monitor relating to efficiency, self-sufficiency and the recycling of raw materials.

National Energy Outlook

The National Energy Outlook (NEV) is an annual assessment of energy management in the Netherlands. The NEV is produced by a consortium, the main members of which are the Energy Research Centre of the Netherlands (ECN), PBL, CBS and the Netherlands Enterprise Agency (RVO). It is commissioned by the Ministry of Economic Affairs, the Ministry of Infrastructure and the Environment, the Ministry of the Interior and Kingdom Relations and the Energy Agreement Monitoring Committee. CBS contributes through the energy statistics and the environmental accounts to the production and description of the data in the NEV relating to energy production and consumption, renewable energy production and economic data for the energy sector.

Natural capital accounts (NCA)

NCA build on the existing national accounts by attempting to describe the use of, and the impact on, natural capital in conjunction with economic statistics. The difference with classical environmental accounts is that natural capital is described from an ecosystem perspective. This means that the natural environment is described in terms of various ecosystems that provide different ecosystem services to the economy (such as carbon storage, water purification and leisure opportunities). Following an initial pilot in 2014, CBS carried out a second pilot for the Ministry of Economic Affairs and the Ministry of Infrastructure and the Environment in the first half of 2015, for which a land-use account was developed for the whole of the Netherlands. A complete set of NCA was also developed for the province of Limburg (CBS, 2015, Chapter 5).

The following were added in Regulation 538/2014/EU:
– environmental protection cost accounts (EPE);
– environmental goods and services sector accounts (EGSS);
– physical energy flow accounts (PEFA).

Criteria for the selection of these modules included policy relevance and the maturity and feasibility of the accounts (Beyond GDP, 2014).

In May 2014, a new strategy for environmental accounts, the ESEA, was drawn up, covering the 2014 to 2018 period (Eurostat, 2014). The focus in this strategy is primarily on the implementation of the six account modules named

above, their quality and usefulness, and advancement of their use. Possible areas for expansion are:
– forestry and water accounts;
– environmental subsidies;
– natural resource management expenditure accounts.

The ESEA 2014 strategy is the EU plan for implementation of the SEEA CF for environmental accounts. Expansion to include ecosystem services and biodiversity is also being considered, although it is preferred to leave developments in this area to the European Environment Agency, with Eurostat and the national statistical offices providing the basic data.

Sustainable National Income

Around 1990, interest grew, in both academic and policy circles, in whether Gross National Product (GNP) or national income should be corrected for environmental damage (e.g. Hartwick, 1990[11]). There is an international agreement not to do so, but instead to link satellite accounts to national account systems that provide a quantitative description of the effect of economic activities on the environment. Parallel to the developments in these 'environmental accounts', the search continued for the possibility of a 'green' (or 'greener') national income.

In 1992, CBS published a methodology for calculating a Sustainable National Income (SNI) (Hueting et al., 1992). A controversial assumption in this methodology was that it is possible to formulate objective sustainability criteria (Hueting and Reijnders, 1996). Such criteria are required to be able to determine the costs involved in meeting these criteria. These costs should then be deducted from the national income to determine the SNI. The 'Monetisation of environmental losses' discussion platform studied this issue at the request of CCS, though without coming to a unanimous conclusion (De Boer et al., 1997). Following parliamentary questions, and commissioned by the Ministry of Economic Affairs, the Institute for Environmental Studies (IVM) began calculations in 1996 to determine the SNI according to the 'Hueting method'. A general equilibrium model of the Dutch economy was developed (the SNI model), but still no clear SNI could be determined. The assumption that a sustainability policy is implemented in other countries in the world, whether or not in a similar form to that in the Netherlands, resulted in particular in large differences in the outcomes. Depending on this assumption, the SNI was calculated to be 34% to 56% lower than the actual net national income (NNI) for 1990. The calculated difference between SNI and NNI steadily decreased between 1995 and 2005, but remained high (22%–42% in 2005) (Hofkes and Verbruggen, 2007; Dellink and Hofkes, 2008).

The successive ministers of Economic Affairs considered calculation of the SNI not to be a task for CBS. In 1994, then Minister for Economic Affairs Andriessen wrote to the Senate that the SNI project concerned 'more econometric research than descriptive statistics' (Andriessen, 1994). Two years later, his successor Hans Wijers noted in a letter to the House of Representatives that the calculation of SNI (which he called Green National Income) was 'not statistics' because 'it does not represent actual, directly measurable events' (Wijers, 1996). His successor, Annemarie Jorritsma, repeated this five years later in a parliamentary debate (House of Representatives, 2001). She argued that CBS should not conduct and publish such calculations, one reason being the debatable nature of the results. The House of Representatives did not agree with her on this point, and adopted a motion that stated that CBS 'in its capacity as supplier of statistical information, is responsible for Sustainable National Income'.

The political debate around SNI (and the role of CBS) seems to have died down over the last 10 years. These days, both in the Netherlands and internationally, the generally accepted direction is that of providing additional information and indicators alongside national income to account for the environmental impacts of economic activity, instead of correcting national income for environmental damage (e.g. http://ec.europa.eu/environment/beyond_gdp/index_en.html). Even so, the question whether the calculation of SNI in addition to standard national income could provide a true analysis of green growth was again raised in the House of Representatives during the debate on 'Green growth' in 2013 (House of Representatives, 2013). However, SNI was not explicitly named in the remit of the Temporary Committee on a Broad Definition of Welfare, established in October 2015.

ESEA 2014 was developed partly based on consultation with the users of environmental accounts. The policy relevance is seen primarily in the light of the Europe 2020 strategy, the 'flagship initiative'[12] for a resource-efficient Europe and the seventh Environment Action Programme of the EU. 'Direct material consumption' is named as an example of a concrete application of one of the environmental account modules (the material flow accounts).

2.3 Current state of affairs and discussion points

The Netherlands has more than 40 years of experience in environmental statistics and over 20 years of experience in environmental accounts; both, therefore, can be considered to be 'mature' in the Netherlands. However,

this process has cost not only time, but also money. It has taken sustained, consistent funding to make this process – with its accompanying analyses and publications – possible.

The general verdict of the interviewees in this study (also those from outside CBS) is that current Dutch environmental statistics are of a high quality and, in many ways, can serve as an example for other countries. The Netherlands has also played an important role in the development of international standards (in particular for environmental accounts) and is closely involved in the definition of indicators for the 17 new Sustainable Development Goals.

However, there are some areas in which the Netherlands differs from most other countries. For example, the environmental statistics and the environmental accounts are housed in different CBS departments, while in other countries they are usually housed in the same department. The main reason for this is that the national and environmental accounts have much in common; housing them in a single department, therefore, results in benefits as far as the quality of the output and the efficiency of the process are concerned. In addition, CBS is the only official body in the Netherlands to supply Eurostat with data (in other countries such data are also supplied by ministries). In addition, and in contrast to other countries, the Pollutant Release and Transfer Register makes use of confidential CBS data, increasing the reliability of the emission data.

However, the generally recognised high quality of Dutch environmental statistics does not mean that there are no deficiencies or unfulfilled wishes. Resources are limited and choices have to be made, so that some statistical time series have to be discontinued (also see 'Spending cuts'). Developments also take place (such as the abolishment of internal borders between EU Member States and the ambition to reduce the administrative burden for enterprises) that make it more difficult to measure certain quantities (e.g. trade flows/footprints and environmental expenditure respectively). Two interviewees also pointed to the vulnerability created by the fact that some environmental statistics have become highly dependent on the expertise of a small number of difficult to replace people.

Many different actors in the Netherlands are involved in producing environmental data, statistics and indicators. In addition to the CBS where (in full-time equivalents) 27 employees work on environmental statistics (excluding energy, nature, agriculture and land use) and 10 employees work on environmental accounts, many other organisations and individual volunteers are also involved, as described above. In general, the interviewees found that the various actors worked well together. There is a clear distribution of tasks[13] in which each party 'does what it is good at', and there are agreements in place concerning coordination and cooperation. Improvements were made in this in the 1990s in particular, before when there were many differences and overlaps. The Netherlands Pollutant Release and Transfer Register was named in this respect as an example of a best practise, also at the international level. New developments, such as the ecosystem accounts, can also result in new partnerships.

Even so, there is still a lack of coordination in some areas. Waste was mentioned in one of the interviews as an area for improvement. In another interview, the example of land-use statistics was given, in which CBS and Alterra apply different definitions. Gaps also remain in environmental statistics; for example, the same interviewee named a lack of good information on manure application methods (CBS figures are based not on the agricultural census but on a theoretical model from the Agricultural Economics Research Institute LEI). As far as the environmental accounts are concerned, environmental subsidies are named as an area in which data could be improved. We also note that statistical classifications are to some extent conservative – necessary to keep consistent, unbroken time series. This, however, implies that the thematic classification of the data in the time series may deviate from the themes currently used and referred to in policy, hampering the link between statistics and policy.[14]

Another issue mentioned in the interviews was the occasional disagreement between actors working in the 'overlap' areas of their respective fields; for example, concerning the extrapolation of trends. Several institutes see this as part of their remit, while the ambition is for unambiguous figures, also when it comes to future projections.

Problems concerning differences in definitions and environmental statistical methods are seen mainly at the international level. Eurostat, the European Environment Agency and the various international environment agreements often apply different definitions and scopes (e.g. to distinguish between process emissions and combustion emissions). Of course, political and economic interests also play a role in this. There may also be differences in definitions in some areas between the Netherlands and international organisations (such as Eurostat and the OECD), for example concerning waste (OECD, 2015). According to one interviewee, differences also exist between CBS definitions and international definitions in the field of transport. Another interviewee

noted that the Netherlands should not stick too rigidly to its own definitions and monitoring methods, with the classification of land use for the Kyoto protocol given as an example.

With regard to the environmental accounts, from an early stage, efforts were made to achieve international harmonisation, so that there are fewer problems in this area. The environmental accounts are also designed to match the classifications of the national accounts (also harmonised internationally). One implication of this is that the environmental information in the environmental accounts relates to Dutch economic activities both within and outside the Netherlands, in accordance with the 'resident's principle', and not just to activities on Dutch soil. In the transport sector in particular, this results in considerable differences with the 'normal' environmental statistics, which are limited to the Dutch territory.

Table 2.3 shows the development of environmental statistics and environmental policy, with an 'intermediary' layer of indicators and reports. In both the environmental accounts and the more traditional environmental statistics, a tendency can be seen towards indicators and other forms of user-friendly communication. The claim was made in one interview that this is becoming increasingly important in policy, as policymakers work for a shorter period of time in the same field than they used to and, therefore, have less detailed knowledge of a particular area.

A related issue concerns the desired level of 'hardness' of environmental statistics. One example is the question whether CBS should also report on the benefits of environmental policy and the value of ecosystem services (Section 3.5). Historically, there has always been a great deal of reticence as far as this is concerned, given both the uncertainties in causal relationships (dose-effect relationships; policy effectiveness) and the subjective elements that play a role in the valuation step. However, this has changed in recent years, and CBS recently began working (together with WUR) on the development of natural capital accounts for the Netherlands, which express the value of ecosystems and ecosystem services in monetary terms. Although this work is experimental (and the results will be published as such), it is clear that this represents a different approach from that taken in the past.

Also the use of indicators such as footprints, have been called potential 'thin ice', because they often involve a large number of assumptions. In this area, CBS is working, jointly with for example PBL, on improving methods for developing footprint indicators.

Furthermore, connecting statistical data to standards or policy objectives (see the discussion on Sustainable National Income) can also decrease their 'hardness'. It seems that there is a dilemma here; to increase the policy relevance of environmental statistics, they are subjected to processing and interpretation for which it is necessary to make certain assumptions. However, given that these assumptions can be debatable, the same processes to increase the statistics' policy relevance can also undermine the 'authority' of the data. Therefore, it is essential, first and foremost, to be completely open about the assumptions made and methods applied in the processing of statistical data. This also gives an idea of the various steps taken, from statistics to interpretation (e.g. trends, interactions, projections) and ultimately translation into policy and the implementation of policy evaluation (Chapter 3).

Table 2.3
Timeline: developments in environmental statistics (including environmental accounts), indicators, reports and policy

Period	1965–1970	1971–1975	1976–1980	1981–1985	1986–1990
Environmental policy (Netherlands)	Environmental Protection Branch established at Ministry of Social Affairs and Employment 1st environmental protection legislation (Pollution of Surface Waters Act (Wvo) and Air Pollution Act (Wlv))	Ministry of Public Health and Environmental Protection established Priority Memorandum on the Environment (Urgentienota Milieuhygiëne)	Memorandum on Environmental Health Standards (Nota Milieuhygiënische normen)	Environmental Protection (General Provisions) Act (Wabm) Ministry of Public Health and Environmental Protection becomes Ministry of Housing, Spatial Planning and the Environment Environmental policy integration plan (Plan integratie milieubeleid) 'More than the sum of the parts' memorandum (Nota meer dan de som der delen) First Indicative Multiannual Programme on the Environment (Indicatief meerjarenprogramma milieubeheer)	First NEPP NEPP Plus Implementation of target group policy Nature Policy Plan (Natuurbeleidsplan)
Environmental indicators and reports (Netherlands)				Sectoral reports (e.g. RIVM, RIZA, RIN, TNO)	'Concern for tomorrow' (1st National. Environmental Outlook) Sectoral outlooks: energy (ESC), agriculture (LEI)
Environmental Statistics — Netherlands	Environment department established at CBS	1st General Environmental Statistics Start of Netherlands Pollutant Release and Transfer Register	Blockade of publication of manure surplus statistics	Quarterly environmental statistics (up to 2000)	
Environmental Statistics — International				Framework for the Development of the Environment Statistics (FDES) (UN)	1st Eurostat environmental statistics
Period	1965–1970	1971–1975	1976–1980	1981–1985	1986–1990

1991–1995	1995–2000	2001–2005	2006–2010	2011–2015
NEPP 2	NEPP 3	NEPP 4	Future environment agenda (Toekomstagenda Milieu)	Sustainability agenda
Environmental programmes	Policy Document on the Environment and the Economy (Nota milieu en economie)	Memorandum on solid values, new shapes (Notitie vaste waarden, nieuwe vormen)		Green Deals
Environmental Management Act (Wet milieubeheer)	Nature Conservancy Act 1998 (Natuur-beschermingswet 1998)		Ministry of Housing, Spatial Planning and the Environment becomes the Ministry of Infrastructure and the Environment; nature moves from ANF to EA	Energy Agreement
Policy Document on Technology and the Environment (Nota technologie en milieu)	Policy Document on Nature, Woodland and the Landscape in the 21st Century (Nota natuur, bos en landschap in de 21e eeuw)			Environment & Planning Act (Omgevingswet)
Policy Document on Products and the Environment (Nota product en milieu)			Environmental Permitting (General Provisions) Act (Wabo)	Decentralisation of environmental policy
				Nature Conservation Act (Wet Natuur-bescherming)
Theme indicators (HSPE)	1st Nature Compendium	1st Sustainability Outlook	Start of Environm. Data Compendium	PBL 'footprint' publications
1st Environmental Balance	1st Nature Balance		1st Assessment of the Human Environment	Sustainability and environmental objectives long-term outlook (2050)
1st Environmental Compendium	Start of Environmental and Nature Compendium		1st Welfare and Human Environment scenario study	New SDG indicators (not yet published)
	SNI calculations		1st Sustainable Netherlands Monitor	
NAMEA (start of CBS environmental accounts)	Start of publication of statistics on StatLine	New CBS Act Spending cuts	1st Environmental Accounts CBS publication	Pilots with 'Natural Capital Accounts'
1st Manual of Environmental Accounting (UN)	Inclusion of environmental statistics in EU statistical programme		EU Strategy for Environmental Accounts	EU Regulation on Environmental Accounts
				System of Environmental and Economic Accounting Central Framework (SEEA CF) (UN)
1991–1995	1995–2000	2001–2005	2006–2010	2011–2015

Notes

1. Source: Proceedings of the Dutch Senate 1987–1988, 25th meeting, 26 April 1988, p. 25-1029.

2. It is notable that the Explanatory Memorandum to the new CBS Act (House of Representatives, 2001–2002, 28 277, no. 3), Section 29 (which deals with CCS subcommissions), states: 'CCS has advisory commissions consisting of experts/non-CCS members in about 20 statistical fields. Through these subcommissions, contact with CBS statistics users is supported.' And, in the same Explanatory Memorandum: 'These advisory commissions provide advice to the director-general and CCS regarding the CBS programme with relation to their own statistical field. The director-general, for his part, consults annually with the heads of the ministries and other major users of the statistics. [...] To supplement these existing procedures, a departmental users' council will be established under the auspices of CCS.' It would seem that the minister assumed that the 20 standing advisory commissions would continue to exist under the new Act (in addition to the users' council), and the disbanding of the advisory commissions was therefore not a necessary or logical consequence of the new Act.

3. Source: http://www.emissieregistratie.nl/erpubliek/ content/explanation.nl.aspx (accessed 5 April 2016).

4. Explanatory Memorandum to National Budget 1976, Public Health and Environmental Health. House of Representatives 1975–1976, 13 600, XVII, no. 2.

5. Council Resolution of 19 June 1989 on the implementation of a plan of priority actions in the field of statistical information: Statistical programme of the European Communities 1989–1992. OJ C 161, 28.6.1989, pp. 1–5.

6. Decision 94/808/EC adopting a four-year development programme (1994–1997) relating to the environmental component of Community statistics. OJ L 328, 20.12.1994, pp. 58–62.

7. Regulation 99/2013/EU on the European statistical programme 2013–2017. OJ L 39, 9.2.2013, pp. 12–29.

8. Adoption of the budget of the Ministry of Economic Affairs for the year 1990. House of Representatives 1989–1990, 21300 XIII, no. 2, p. 120.

9. The CBS General Environmental Statistics 1973 and 1974 publications contain data and graphs that clearly show the explosive growth in manure production since 1960.

10. Response by LNV Minister Gerrit Braks to questions from MP Piet Blauw (VVD party) concerning manure legislation. House of Representatives, Session 1989–1990, Appendix to the Proceedings, 757.

11. Attention was paid to this much earlier in smaller circles in the Netherlands. See for example Hueting (1974).

12. Flagship initiatives are initiatives of the European Commission that aim for 'smart, sustainable and inclusive growth' within the framework of the Europe 2020 strategy. See http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/flagship-initiatives/index_en.htm (accessed on 11 February 2016).

13. This distribution of tasks is partly historical, which means that – for example – data on waste are not maintained by the Netherlands Pollutant Release and Transfer Register or by CBS, but by Rijkswaterstaat Environment (as successor to the Waste Management Council (*Afval Overleg Orgaan*) and Waste Management Department (*Uitvoering Afvalbeheer*)).

14. Examples are greenhouse gases, acidifying substances and substances that affect air quality. These represent three different policy areas, but CBS classifies these emissions as 'air'.

The use and importance of environmental statistics

3.1 Introduction

Environmental statistics (including the environmental accounts) are produced to provide coherent information over a long period of time. However, the remaining question is that of how this information is being used? According to the producers of statistics, the demand for environmental statistics partly determines the supply. Dijkerman (2010) stated: 'The development of the environment statistics [...] has been predominantly demand-driven'. And Schenau et al. (2009) claim: 'On the national level there is [...] much interest in the environmental accounts, as environmental institutes and ministries use this data for environmental-economic analysis and policy development'. That the availability of environmental statistics is also valued by the users became apparent during the commotion that followed the announcement of cutbacks (Section 2.1.2).

The users and applications of environmental statistics can vary widely. An impression of this is given in the current chapter based on examples, interview results and a number of quantitative analyses. The information contained in environmental statistics and environmental accounts can be used in various phases of the policy cycle:
– awareness-raising, agenda-setting and prioritisation of environmental issues;
– supporting policy development ;
– policy monitoring, evaluation and adjustment.

Furthermore, three other fields of application can be distinguished:
– the extent and distribution of environmental costs and benefits;
– international comparisons and obligations;
– scientific research (not directly policy-related).

These points are elaborated below.

3.2 Awareness-raising, agenda-setting and prioritisation of environmental issues

Publications about environmental statistics or those that use such statistics can draw the attention of the general public to developments taking place in the environmental field concerned, depending of course in part on the amount of attention they receive from the media. A good example of this is the quarterly publication of CO_2 emission figures. At the same time that it publishes a first estimate of GDP, CBS also produces an initial estimate of the CO_2 emissions due to economic activities. These data may be less important in analytical terms, but they do attract the attention of the media. They, therefore, contribute to a broader understanding of welfare; in other words that welfare is more than GDP growth alone. The distinction between the environmental accounts and 'normal' environmental statistics is also important in this regard: the emissions resulting from Dutch economic activities are higher than emissions that take place on Dutch territory. For the Netherlands, therefore, the calculated greenhouse gas emissions based on environmental accounts are higher than those based on the Kyoto reports (which rely on territorial emission statistics). The first approach therefore, would seem to be made redundant given international obligations, but it does demonstrate added value as it enables comparisons to be made and, therefore, political debate regarding the responsibilities for emissions.

Another example of a specific environmental issue in the Netherlands that became political, partly due to the publication of environmental statistics, is that of manure (also see the text box on 'Environmental statistics and manure surpluses' in Chapter 2). Interviewees also believe that the indicators developed for the 'circular economy' and 'green growth' could be well used in agenda-setting.

Of course, the fact that statistics can play such a role does not mean that environmental issues only appear on the political agenda once the relevant statistical information is published. Climate change and greenhouse gases, for example, were already high on the political agenda before the Environmental Statistics and Environmental Data Compendium started to pay specific attention to these issues at the end of the 1990s (Table 2.1).

Nature and environmental organisations often use environmental statistics to draw political attention to certain issues. For example, Natuur & Milieu published the report 'Ranking the Stars' (Natuur & Milieu, 2011) in 2011, which compared the environmental performance of the Netherlands with that of other EU countries. The report attracted a lot of political attention and led to parliamentary questions[1]. The report made use of the Environmental Performance Index, developed by Yale University, and various EEA, PBL and other publications – in other words 'processed' statistics. In contrast, CBS was only referenced once as a direct source in the report (for greenhouse gas emissions). Another example of an 'environmental number' that received much attention was the estimate of 18 000 early deaths in the Netherlands due to particulate matter (MNP, 2005). Again, these were not 'statistics' in the sense of observed or measured numbers, but statistical calculations (which were however based on best available scientific insights).

3.3 Supporting policy development

Much use is made of statistical information in supporting the development of environmental policy. As it was succinctly put in one of the interviews, no environmental statistics means no effective environmental policy, although that does not mean that no environmental policy is implemented without the use of statistics. The first Dutch environmental policy document, the Priority Memorandum on the Environment (Stuyt, 1972) contained almost no quantitative information to support policy proposals. In addition, the few figures that were used did not come from official statistics but from expert estimates.

The various indicative multiannual programmes developed in the 1970s and 1980s contained more quantitative data (although the role of statistical information was not always clear due to the lack of references). In any case, environmental statistics certainly played an important role in the later National Environmental Policy Plans. The report 'Concern for tomorrow' (RIVM, 1988) was an important stimulus for the systematisation of Dutch environmental policy, as it provided a clear overview of the environmental data

available at the time, and, therefore, a firm quantitative foundation for the first NEPP in 1989. As part of the work carried out for NEPP-1 and its successors, not only were the Environmental Outlooks published by RIVM, but also special CBS publications ('*Milieufacetten*') in which the statistical material corresponding to the policy themes was presented (CBS, 1988 and 1991).

Nowadays, relatively little use is made of 'pure' statistics in policy; rather studies and indicators that are based on the statistics and accounts. An example given by the interviewees is that of energy policy, which is partly based on the National Energy Outlook – a joint publication by CBS, PBL and others. The Environmental Data Compendium and other joint publications and PBL publications were also mentioned in the interviews as more useful sources for environmental policymakers than the environmental statistics themselves. The policy demand for specific environmental statistical information and interpretation can also be seen in the requests made to CBS (see 'Environmental accounts: examples of recent developments and applications' in Section 2.2). Policymakers value the independent status of CBS, but also experience a certain conflict between supply and demand as far as concrete statistical products are concerned. Examples given are the indicators for 'green growth' and the 'circular economy'. In the case of the 'green growth' indicators, CBS has chosen to comply with the OECD framework (Appendix 2).

According to the interviewees, the links that can be made between the environmental accounts and sectors, industries and income groups offer particular opportunities for economic policy. This is seen, for example, in the use of data from the environmental accounts in Duch top-sector policy (CBS, 2012 and 2015a) and business policy (EZ, 2014 and 2015). At the EU level, too, the importance of the environmental accounts mainly appears to be acknowledged in the preparation and evaluation of economic policy. This can be seen, for example, in the consultations carried out by the European Commission during its preparatory work for the Regulation on environmental-economic accounts (691/2011): 'Users put a lot of emphasis on the analysis and applications of environmental accounts in modelling and outlooks, both for preparing policy proposals and for reporting on policy implementation and impacts. Examples are the development of fiscal policy relating to climate change and energy consumption, for example, or the assessment of the impacts of international trade on emissions and resource use' (EC, 2010).

Environmental statistics and environmental accounts, therefore, are important for the development of effective policy, but they are better able to inform and support

policy if they are provided with context, and if they are interpreted in a way that gives them meaning for policymakers. In other words, the statistical material provided often needs to be processed to show the implications in terms of policy challenges, policy options and the possible effects of these. This is addressed in more detail in Section 4.2.

3.4 Policy monitoring, evaluation and adjustment

Monitoring and evaluation were named in the interviews as two of the main applications of environmental statistics. However, this does not mean that the available statistics always provide a seamless response to policy demand. The progress being made in the Green Deals, for example, is mainly monitored based on reports provided by the sectors involved, and it is often not possible to compare these reports with CBS data. The monitoring of policy progress relating to the circular economy is also not always possible based on published statistical data As in the case of informing policy (Section 3.3), environmental statistics often have an indirect role in monitoring and evaluation. The progress made in achieving objectives and in meeting agreements and standards is often not measured directly against statistical data, but rather against projections and model calculations that are based on the statistical information. An example of more direct influence is the monitoring of the Energy Agreement. The Progress Report 2015 (SER, 2015) refers to the National Energy Outlook (ECN et al., 2015), to which CBS also contributed. One of the inter-viewees noted that, partly due to the analyses in the Energy Outlook, the awareness has grown that additional policy commitments are required to achieve the objectives of the Energy Agreement.

As far as monitoring and evaluation of environmental policy are concerned, data reliability is often an issue. Direct measurements are often regarded as a more reliable data source than calculations. Examples named in the interviews concerned the noise levels at Schiphol airport and air quality. However, the higher reliability of measurements needs to be weighed against the higher costs. In many cases, environmental quality needs to be measured nationwide, which requires a costly monitoring network. In practise, therefore, use is often made of a combination of measurements and calculations, in which measurements are used to validate model calculations. Note that, if a choice is made for calculations, the uncertainties associated with the calculations must always be carefully described.

The 'De Kwaadsteniet affair' is a Dutch example of the imperative of doing so.[2]

The environmental accounts play a particularly important role in monitoring the performance of the Netherlands at the interface between the economy, the environment and natural resources, and in the corresponding indicators. They are used, for example, to develop 'green growth' indicators (CBS, 2015b). One example is the state of decoupling in each sector (environmental pressure and energy/resource consumption per unit production or GDP). Use is also made of the environmental accounts (e.g. CBS, 2012; EZ, 2015) and the environmental account-based indicators (e.g. CBS, 2015a,b) for monitoring 'green growth' at a sectoral level, in particular in Dutch top-sector policy.

3.5 The extent and distribution of environmental costs and benefits

Quantitative data can contribute to a better understanding of the costs involved in the implementation of environmental measures and of the resulting benefits. It is also important, as far as the policy decision-making process is concerned, to know who is, or should be, responsible for the costs, and who profits from the benefits.

CBS began compiling statistics on the environmental expenditure of both the government and enterprises in the 1970s (also see the text box on 'Environmental expenditure statistics' in Chapter 2). These statistics have been used frequently in various environmental policy documents, and in policy implementation. An example is the calculations made for the EU Water Framework Directive, which obliges Member States to ensure that the various water-consuming sectors make a reasonable contribution to the recovery of costs for water services, including environmental and resource costs (Rijkswaterstaat, 2013).

An early example of the use of environmental statistics for providing insight into the distribution of environ-mental costs between countries can be found in the response of the Minister of Housing, Spatial Planning and the Environment Pieter Winsemius to parliamentary questions from the Senate in 1985.[3] Members of the Senate had expressed their concern about the possible distortion of competition in the case of large differences between the Netherlands and surrounding countries in investments made to combat air pollution. Using the statistics available on investments made by enterprises in the environment, the Minister showed that the

investments made to combat air pollution (as a percentage of total investment) had remained at roughly the same level in the preceding years in the Netherland and West Germany. No statistical comparison was possible with France and the United Kingdom, but the Minister had the impression that air pollution investments in both countries lagged behind those made in the Netherlands.

These days, a large proportion of emission reduction regulations are set at the EU level, with use often made of models to estimate the costs and benefits (including the distribution among Member States and sectors).[4] In turn, these models use statistical data for their validation, in addition to other information such as expert cost estimates of new technology. Here again, transparency regarding the assumptions applied is essential.

When regulations enter into force, statistical information is still required to assess the costs involved. EU Regulation 295/2008 concerning structural business statistics specifies which environmental statistics must be compiled. The preamble to this regulation (point 4) reads: 'Special attention should be paid to the impact on business caused by Community energy and environmental policies, such as those embodied by the REACH Regulation (EC) No. 1907/2006'. It seems that there was a need at the EU level for greater insight into the actual costs of certain environmental regulations for businesses. However, the cost statistics are unable to show a direct link to specific regulations as the costs are only categorised according to a limited number of characteristics (such as climate, air, water and waste).[5] In this case, better data on costs, for example linked to specific regulations, could help in the comparison of the efficiency of different policy tools – something that is not yet possible.

Interest in the possible role of environmental statistics in showing the damage caused by pollution (and, therefore, the potential benefits of environmental policy) was an issue at an early stage in the Netherlands. In his response to parliamentary questions, Minister of Public Health and the Environment Ginjaar stated in 1980 that he would 'support, within the existing capabilities, the expansion of environmental statistics to include damage and recovery costs'.[6] However, such an expansion never took place, and, as emerged from one of the interviews, policymakers indicate an ongoing need for statistical material that can be used to describe the benefits of environmental policy. This concerns both the direct benefits of a better environment and indirect benefits such as jobs and innovation.

CBS, together with Wageningen UR, is taking a new step towards environmental valuation with the development of natural capital accounts (this time, by means of an ecosystem services framework). A first experimental application was in 2015 for the Province of Limburg (CBS, 2015b, Chapter 5; Remme, 2016). Highlighting the 'indirect benefits' of environmental policy may be supported by initiatives such as the EGSS accounts named in Section 2.2.2.

3.6 International comparisons and obligations

Many of the interviewees considered meeting the reporting obligations made necessary by EU policy and international agreements as an important application of environmental statistics; in the case of the Pollutant Release and Transfer Register it was even named to be the main application. The relative importance of this has increased with the expanding role of EU legislation as a framework for Dutch environmental policy. Of course, this can be seen as a 'derived' function of the monitoring and evaluation discussed in Section 3.4, as these reporting obligations are intended to provide insight into the extent to which the Netherlands meets agreements and obligations and how it compares with the other Member States (or treaty partners). Ultimately, therefore, these comparisons can result in policy change.

The UNECE Aarhus Convention, drawn up in 1998, grants the public rights regarding access to environmental information, but does not imply any commitment to the compilation of certain statistics. However, the Kiev Protocol on Pollutant Release and Transfer Registers (PRTR) to the Aarhus Convention entered into force in 2009. It should be noted that PRTR legislation has been in force for longer than this in the EU (see below).

The cooperation between CBS and Eurostat (in the context of the European Statistical System) is determined in the Regulation on European statistics[7] and the European statistical programme 2013–2017[8]. Examples of EU regulations that result in specific obligations to provide data to Eurostat and/or the European Environment Agency are:
– the Regulation on waste statistics (2150/2002);
– the Regulation concerning statistics on pesticides (1185/2009);
– the Regulation on environmental-economic accounts (691/2011, extended with 538/214; also see Section 2.2.2);

– the INSPIRE Directive[9] (2007/2), which enables the production and sharing of the spatial information required for European environment policy;
– the E-PRTR directive (166/2006), which sets up a European Pollutant Release and Transfer Register; the Netherlands Pollutant Release and Transfer Register plays an important role in the implementation of this in the Netherlands.

Various international treaties, such as the Climate Convention (UNFCCC), also oblige signatories to provide statistical information, and the Netherlands Pollutant Release and Transfer Register also plays an important part in these. In addition, there are the 17 UN Sustainable Development Goals (SDGs) (successors to the Millennium Development Goals), to be met by 2030. Environmental statistics and environmental accounts will also play an important role in monitoring and reporting the progress made in achieving the SGDs (Lucas et al., 2016).

The OECD focuses to a large extent on 'green growth', with the environmental accounts used to develop harmonised green growth indicators (OECD, 2014; also see Appendix 2). The CBS 'Green Growth' report also makes use of data available at the international level to compare the Netherlands with other OECD countries as far as green growth is concerned (CBS, 2015b).

3.7 Scientific research

Much use is made of statistical data in scientific research, including environmental statistics and environmental accounts. An impression of this is given in Table 3. The table shows the number of academic publications found by three different databases/search engines using the search terms 'CBS, Netherlands' and 'environmental accounts, Netherlands'. The term 'environmental account' (or alternative search terms 'environmental accounts' and 'environmental accounting') was found to be most frequently used in the academic journal of *Ecological Economics*.

Notes

1. Letter from the Standing Committee of Infrastructure and the Environment of the House of Representatives to Secretary of State Joop Atsma, 28 October 2011, reference 2011Z21098/2011D52420.
2. Hans de Kwaadsteniet, at the time employed as a statistician at RIVM, claimed on 20 January 1999 in the newspaper *Trouw* that most of the models used in the environment department at RIVM were not subjected to proper statistical model testing and that the environmental quality information displayed as maps in the Environmental Balance usually contained no information on the accuracy of the information. His criticism caused quite a commotion and, in response, RIVM developed the 'Uncertainty Assessment' guideline, and since then has always paid explicit attention to the reliability of the data presented in its reports (PBL, 2005).
3. Memorandum of Reply, Amendment to the Air Pollution Act, 8 July 1985, Dutch Senate, 1984–1985, 17 965, 172a.
4. See for example the Impact Assessment accompanying the Clean Air Programme for Europe policy programme presented in December 2013 (http://ec.europa.eu/environment/archives/air/pdf/Impact_assessment_en.pdf, accessed on 5 January 2016).
5. A recent study for DG Environment of the European Commission (Jantzen, 2015) shows developments in environmental costs for a number of sectors in the EU over the period 1995 to 2012 (based on Eurostat data), but does not provide any links to specific legislation.
6. Standing Committee on Environmental Protection, 3rd meeting, 21 April 1980. Proceedings of the House of Representatives 1979–1980, p. 1658.
7. Regulation 223/2009 on European statistics. Official Journal of the EU L87, 31.3.2009.
8. Regulation 99/2013 on the European statistical programme 2013–2017. Official Journal of the EU L39, 9.2.2013.
9. Infrastructure for Spatial Information in Europe.

Table 3.1
Search results for environmental statistics and environmental accounts in academic publications

Database/search engine ↓	Search terms →	'CBS' and 'Netherlands'	'Environmental accounts' and 'Netherlands'
Google Scholar	total	± 85 700	1 910
Science Direct	total	30 739	333
	environmental sciences	3 235	213
Springer Link	total	8 025	558
	environmental sciences	1 235	321

Synopsis, conclusions and recommendations

With this report, we have tried to answer the question of *how* environmental statistics and environmental accounts can contribute to improving national policy. What can other countries and the WAVES programme learn from the way in which the Netherlands uses this information to improve policy? Who are the users, and do the statistical series meet their needs? How, and at which stage of the policy development process, is the information used?

Environmental statistics have been produced in the Netherlands for over 40 years, and environmental accounts for over 20 years. However, no analysis appears to have been made of the interplay between the creation of these data series and the ways in which they inform and improve national policy. From the literature research, the interviews and the anecdotes provided in Chapters 2 and 3, three main points can be deducted that seem relevant to the WAVES programme. These are a) the decision-making process relating to choices in the compilation of the environmental statistics and accounts and cooperation with other parties in collecting the data; b) the awareness that the translation from primary data to policy-relevant information is a separate task that requires a certain expertise that is different from the expertise required in the development of statistics; and c) the use of multiple channels for linking environmental statistics to policy.

4.1 Transparent decision-making process regarding environmental statistics and a long-term vision

The decision-making process as it relates to environmental statistics involves weighing up several interests, either implicitly or explicitly. On the one hand, choices always need to be made when resources are limited, which implies that not all statistical needs can be met. The meeting of international obligations, such as EU regulations, is often given as an argument for continuing existing statistics and making them immune to spending cuts. The long term should also be considered; statistics can increase in meaning and value as they are collected over a longer period of time, as this allows the detection of trends and developments. On the other hand, political developments also play a large role. For example, there is now more focus on 'green growth', and even on jobs in cleantech sectors. However, such specific issues do not always correspond to the data available on the past years, let alone decades.

The process according to which these choices are made must be clear and transparent. Up to 2004, the Netherlands had a special Environmental Statistics Advisory Committee. CBS currently still has a number of advisory councils, in which PBL and RIVM are also represented. CBS also has 'account teams', including one for the Ministry of Infrastructure and the Environment. Separate studies can be commissioned for specific questions that fall outside the existing CBS work programme. Within this programme, CBS has a certain autonomy to make choices concerning the data series to be compiled. Even so, the available budget determines the amount of work that CBS can carry out and, therefore, indirectly influences the statistics produced. CBS is included in the budget of the Ministry of Economic Affairs, which means that this ministry has a considerable influence on the resources available to CBS.

As well as clarity regarding the institutional side, a conceptual basis can also help increase transparency in prioritisation. This should go beyond fashionable political themes, and in particular should ensure that the statistics provide sufficient coverage over the various environmental domains, so that they remain relevant in the long term, and that they are able to provide sufficient links to adjoining domains, such as public health and economic sectors.

A last lesson to be drawn is that there may be possibilities to share data collection activities. The distribution of

tasks in the Netherlands has developed over time, with both government bodies (e.g. Rijkswaterstaat) and non-governmental organisations playing a role. A good example of the latter are the data on species in the Netherlands, collected by NGOs and volunteers. The statistics office controls the statistical quality of the data collected by the volunteer organisations, while such partnerships greatly add to its production capacity.

4.2 Translation of statistics into policy a separate task

As described in the previous chapters, in many cases, raw statistical data are not used in this form by policymakers. Very often, one or more processing steps are applied, for example by placing the data in the perspective of other developments or by comparing the data with policy objectives or international goals. More complex processing can also be applied; for example, by using the data in modelling, scenario analyses and projections for the future. These require a considerable amount of work, in addition to that involved in the collection of raw data and creation of statistical series.

Interpretation and analysis for policy, therefore, goes further than the presentation, or possible extrapolation, of historical trends, and requires a different type of expertise. There is often a need for aggregated data, or indicators that are based on several data series. Understanding the reasons behind historical develop-ments often requires insight into the functioning of the system that causes the developments (system analysis). Understanding the system is a prerequisite for making future projections, for assessing uncertainties in future developments and for advising on the potential of various policy tools. In addition, policy evaluation requires knowledge of policy instruments and evaluation methods.

Thus, for the WAVES programme, the first insight is that this intermediary role must be explicitly allocated, if the environmental statistics and accounts are to prove their value to policy. There are several institutes in the Netherlands that are specialised in strategic policy analysis and evaluation. However, other bodies – including CBS – also interpret statistical material (Section 4.3.1).

Another insight is that the assumptions made and the methods on which the interpretation is based must always be made clear and explicit when translating or processing statistical data. This can be seen, for instance, in the examples given in Chapters 2 and 3. Without such

clarity, critical reflection and independent assessment are not possible, and this can damage the faith that policymakers and society have in the institutes concerned. The interviews suggested that separating the tasks of environmental statistics compilation and data quality control, on the one side, and their use in policy advice and evaluation, on the other, may create a greater sense of trust in the national statistical office. In practice, there is less discussion in society regarding the statistical methods of data collection (although not, of course, among statisticians) and more discussion about the methods and assumptions that result in policy analysis and advice. This makes sense; the compilation of historical data produces more reliable results than the interpretation of system interactions, let alone the prediction of future developments. Division of these roles can ensure that discussions concerning assumptions and interpretation remain separate from the facts, so that the national statistical office is less the subject of political and public debate. However, there is of course a lot to be said for making use of the knowledge of statistical offices in policy analysis, and damage to the reputation of a policy analysis institute can be just as harmful. Most important is that the assumptions and the methods applied in the interpretation of statistics are clearly and explicitly reported.
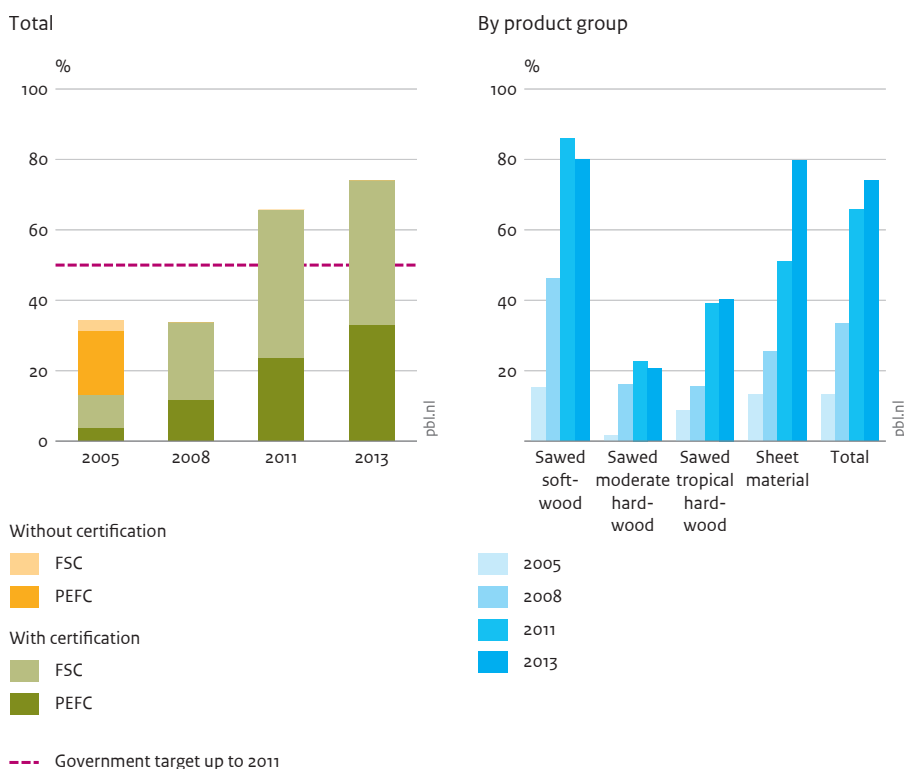
4.3 Multiple channels for linking statistics and policy

The way in which statistical data are communicated has a large effect on their value. Environmental statistics are most useful for – and have the most influence on – policy if they are presented in a 'policy-relevant' form; for example, by aggregating them, combining them with other statistics, processing them into indicators and/or linking them in any other way to policy objectives and standards. There are various channels in the Netherlands for publishing environmental statistics that focus on policy advice and evaluation. The three most important of these are 1) reports from government institutes and other institutes focusing on policy analysis; 2) the online Environmental Data Compendium; and 3) mandatory reports and national committees.

4.3.1 Policy analysis and evaluation institutes
There are several institutes in the Netherlands that have policy advice and assessment as their core task. First of all, there are the three policy assessment agencies, of which PBL focuses on the environment, nature and spatial planning. PBL supports political decision-making and policy by conducting outlooks, analyses and assessments in these fields. In addition to these policy assessment

Figure 4.1
Market share of certified timber

Total

By product group

Without certification
FSC
PEFC

With certification
FSC
PEFC

2005
2008
2011
2013

--- Government target up to 2011

Source: Probos

An example of the data available in the Compendium; in this case, the market share of timber certified under the sustainability criteria of FSC and PEFC.[1]
Information is provided on the data breakdown (different certification systems, but also different product groups) that is required to analyse developments.
Change in time (years) is of course also displayed. The dashed line represents the official policy objective (50%). Finally, the source of the data is Probos,
a non-profit institute that advises on timber, the timber market and sustainable forestry.

agencies, there are various advisory bodies advising the Dutch Government on current and future environmental, nature and spatial planning policy, such as the Scientific Council for Government Policy and the Council for the Environment and Infrastructure. CBS nowadays also focuses more on the interpretation and analysis of environmental statistics and environmental accounts for policy.

Furthermore, there are a number of knowledge institutes that have only a limited or no relationship with the government. These are, for example, institutes affiliated to universities, such as Alterra, independent (formerly public) institutes such as ECN and TNO, and many other private research companies and consultancy agencies, such as CE Delft. These institutes receive regular commissions from the Dutch government (and other bodies) for assessment and advisory work, for which they often rely heavily on publicly-available environmental statistics.

4.3.2 Environmental Data Compendium

The Environmental Data Compendium is a website that provides facts and figures on the environment, nature and spatial planning in the Netherlands, with the aim to provide a scientific foundation for public and political debate.[2] The Compendium is maintained by CBS, PBL and Wageningen University, and also makes data available from other institutes and organisations.
The Compendium attempts to facilitate a basic level of understanding of the data by displaying indicators in a policy-relevant manner and by creating links to other indicators. This is illustrated in Figure 4.1. Open access to environmental statistics such as those provided by the Environmental Data Compendium allows others, including NGOs and universities, to develop their own analysis, indicators and models, some of which of direct relevance to policy.

4.3.3 Mandatory reports and national committees

The statutory nature in the Netherlands of reports on developments in the environment helps ensure the continued availability of consistent information. It also highlights the political demand and policy relevance. Linking these legal requirements to specific policy (e.g. the reporting obligations in various EU directives and regulations) also helps ensure the availability of data that make analyses of policy effects and effectiveness possible.

To help in the development of national environmental policy, the Dutch Government has the mandatory task to report regularly on the state of the environment, nature and spatial planning. Between 1995 and 2009, RIVM (and its successors MNP and PBL) published an annual Environmental Balance, reporting on the state of the environment in the Netherlands. These reports enabled the government to make annual adjustments to its environmental programme. RIVM (and later MNP) also produced an Environmental Outlook once every four years containing information on the expected effects of environmental policy and options for potential policy changes. Policymakers were able to use this knowledge to draw up a new NEPP. Publication of the annual and the four-yearly environmental reports became mandatory in 1996 (VROM, 1996), and the publication of similar reports for nature also became mandatory in the amendment to the Nature Conservancy Act 1998.

This planning cycle was abandoned in 2009 as policymakers found it inefficient to have to respond to new environment and nature data every year. Since 2010, PBL has produced an Assessment of the Human Environment once every two years, which incorporates the former Environmental Balance and Nature Balance, with additional information on spatial planning in the Netherlands. Furthermore, the lack of political need for a new NEPP every four years meant that there was no longer any need for a corresponding Environmental Outlook. MNP produced its last (sixth) Environmental Outlook in 2006 (MNP, 2006). Since then, PBL has produced outlooks on sub-themes, such as the National Energy Outlook (once a year since 2014) and the Nature Outlook 2010–2040 (PBL, 2012b).

National committees are established to address a certain theme, and are usually temporary in nature. The most recent example is the Nijpels committee, which oversees and supports the implementation of the Energy Agreement (SER, 2015).[3] The National Energy Outlook resulted from this agreement (Schoots and Hammingh, 2015). This report, produced by a partnership of Dutch knowledge institutes, provides an annual overview of developments in the national energy system.

Such monitoring can be used to adjust policy where necessary to achieve the goals.

4.4 In conclusion

Based on a historical overview, this report highlights three main recommendations that may help in making environmental statistics and environmental accounts more useful in supporting national policy. Transparent decision-making, interpretation and analysis as a separate task in an organisation that acts as an intermediary between statistics and policy, and the use of multiple communication channels can provide a stable foundation for the disclosure and effective use of the potential provided by environmental statistics. In relation to this, it remains important to take into account the phases of the policy cycle, as the nature of the data, the indicators required and the desired level of detail differ according to the policy phase.

We note that, although the primary focus of this study is to inform other countries of experiences in the Netherlands, it would be worthwhile to review the Dutch situation with these lessons in mind, and to assess whether, and if so where, it could be improved.

It took decades for the Netherlands to arrive at the current practice. In the developing and transition countries in which WAVES is active, available resources may be more limited, and their environmental accounts often still have to prove their usefulness and added value for the policy cycle. WAVES, in this light, could look for ways to leapfrog this long development process by adopting the lessons learnt in the Netherlands – using consultation and partnerships, regarding interpretation as a separate task, using multiple channels – in a way that is considerably more cost-effective and quicker.

Notes

1. http://www.compendiumvoordeleefomgeving.nl/indicatoren/en1465-Sustainable-production-chains%3A-wood.html?i=41-206 (accessed on 19 February 2016).
2. http://www.compendiumvoordeleefomgeving.nl/ (Environmental Data Compendium, with an English translation available for most parts of the site) (accessed on 19 February 2016)
3. The Energy Agreement aims to form the basis of a future-proof energy and climate policy in the Netherlands that is widely supported by the government, employers and employees. A committee has been established to monitor progress.

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Appendix 1: List of interviewees

Ellen Brinksma, Statistics Netherlands
Hendrik-Jan Dijkerman, Statistics Netherlands
Frans Duijnhouwer, Ministry of Infrastructure and the Environment
Cor Graveland, Statistics Netherlands
Wim van der Maas, National Institute for Public Health and the Environment
Mark Overman, Ministry of Infrastructure and the Environment
André Rodenburg, Ministry of Infrastructure and the Environment
Sjoerd Schenau, Statistics Netherlands

The Ministry of Economic Affairs indicated they were not available to participate in the interviews.
Therefore, the report pays relatively little attention to the use of nature statistics and to specific uses and requests by this ministry in relation to environmental accounts.

Appendix 2:
OECD green growth indicators

OECD indicators for green growth	
1. The environment and resource productivity of the economy	- Carbon and energy productivity - Resource productivity: materials, nutrients, water - Multi-factor productivity
2. The natural asset base	- Renewable stocks: water, forest, fish resources - Non-renewable stocks: mineral resources - Biodiversity and ecosystems
3. The environmental dimension of quality of life	- Environmental health and risks - Environmental services and amenities
4. Economic opportunities and policy responses	- Technology and innovation - Environmental goods and services - International financial flows - Prices and transfers - Skills and training - Regulations and management approaches
- Socio-economic context and characteristics of growth	- Economic growth and structure - Productivity and trade - Labour markets, education and income - Socio-demographic patterns

Source: OECD (2014)