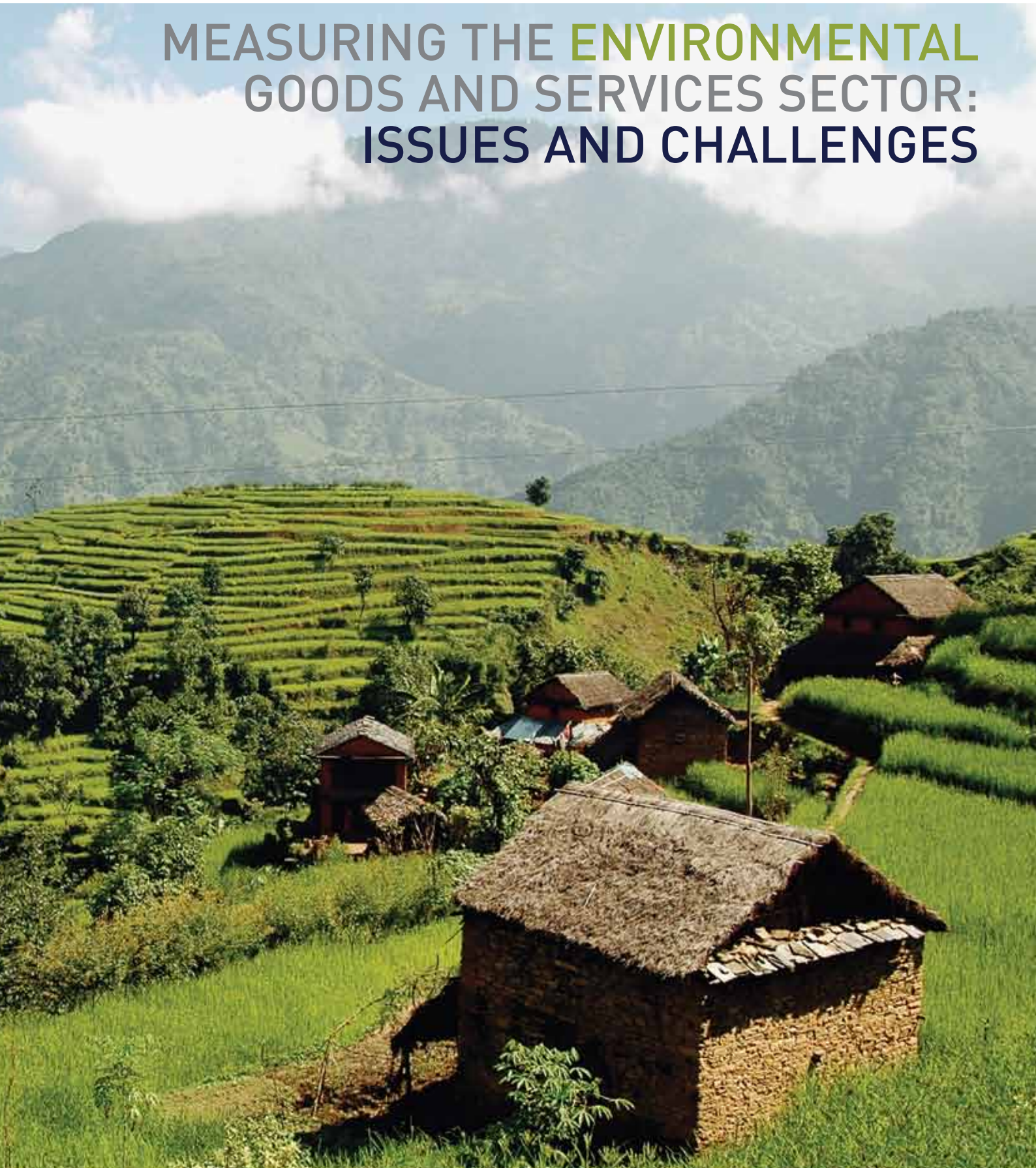




GREEN **economy**

Working Paper No. 1

MEASURING THE ENVIRONMENTAL GOODS AND SERVICES SECTOR: ISSUES AND CHALLENGES





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MEASURING THE ENVIRONMENTAL
GOODS AND SERVICES SECTOR:
ISSUES AND CHALLENGES

LIST OF FIGURES

- 13 **Figure 1** EGSS output by type of market, non-market and ancillary activities, latest available year (% of GDP)
- 13 **Figure 2** EGSS market output by environmental domain, latest available year (% of GDP)
- 15 **Figure 3** Trends in EGSS total output and breakdown by market, non-market and ancillary activities for EU28
- 15 **Figure 4** EGSS employment for EU28 ('000 full-time equivalents)
- 17 **Figure 5** Revenue from sales of environmental goods and services, Canada, 2010 ('000 CAD)

LIST OF TABLES

- 9 **Table 1** EGSS main sources of data from existing statistics and accounts
- 11 **Table 2** Illustration of the EGSS module legal proposal for amending the Commission Regulation (EU) 691/2011

LIST OF ACRONYMS

ABS	Australian Bureau of Statistics
APEC	Asia-Pacific Economic Cooperation
CAD	Canadian Dollar
CBS	Statistics Netherlands
CEPA	Classification of environmental protection activities
COFOG	Classification of the Functions of Government
CRema	Classification of resource management activities
EC	European Commission
EEA	European Environmental Agency
EGSS	Environmental Goods and Services Sector
EP	Environmental Protection
ESA	European System of National and Regional Accounts
ESCAP	UN-Economic and Social Commission for Asia and Pacific
ESCWA	Economic and Social Commission for Western Asia
EU	European Union
GGGI	Global Green Growth Institute
ILO	International Labour Organization
ISIC	International Standard Industrial Classification of All Economic Activities
NACE	Statistical Classification of Economic Activities in the European Community
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
RM	Resource Management
SEEA	System of Environmental-Economic Accounting
SNA	System of National Accounts
UNEP	United Nations Environment Programme
VAT	Value added tax
WTO	World Trade Organization

TABLE OF CONTENTS

iv	LIST OF FIGURES AND TABLES
iv	LIST OF ACRONYMS
1	ACKNOWLEDGEMENTS
2	1 WORKING TOGETHER TOWARDS MEASURING GREEN ECONOMY
4	2 THE ENVIRONMENTAL GOODS AND SERVICES SECTOR (EGSS)
4	2.1 THE BIRTH OF THE EGSS FRAMEWORK
5	2.2 OVERVIEW OF THE MAIN STATISTICAL ELEMENTS
8	2.3 DATA SOURCES
10	3 RECENT DEVELOPMENTS AND APPLICATIONS
10	3.1 EU
10	3.1.1 THE EU'S PROPOSED REGULATION ON ENVIRONMENTAL ECONOMIC ACCOUNTS
11	3.1.2 REFINEMENT OF METHODOLOGIES PROPOSED IN THE 2009 HANDBOOK
12	3.1.3 REGULAR DATA COLLECTION IN SOME EU COUNTRIES AND AVAILABILITY OF EU AGGREGATES
16	3.2 COUNTRIES OUTSIDE EUROPE TESTING THE EGSS FRAMEWORK
16	3.2.1 UNITED STATES AND CANADA
16	3.2.2 AUSTRALIA
17	3.2.3 CHINA
18	3.2.4 KOREA
18	3.3 WORK OF INTERNATIONAL ORGANIZATIONS ON MEASURING GREEN ECONOMY
20	4 ISSUES AND CHALLENGES
20	4.1 WHAT IS THE SCOPE OF THE "GREEN ECONOMY"? HOW CAN EGSS DATA BE INTERPRETED BY POLICYMAKERS?
21	4.2 WHAT ACTIVITIES SHOULD BE COVERED?
22	4.3 HOW TO MEASURE CLEANER AND MORE RESOURCE EFFICIENT PRODUCTS
22	4.4 HOW TO GET THE RIGHT PICTURE
24	5 CONCLUSIONS AND NEXT STEPS
26	NOTES
26	ANNEX I. CLASSIFICATION OF RESOURCE MANAGEMENT ACTIVITIES FOLLOWING THE SEEA
27	REFERENCES

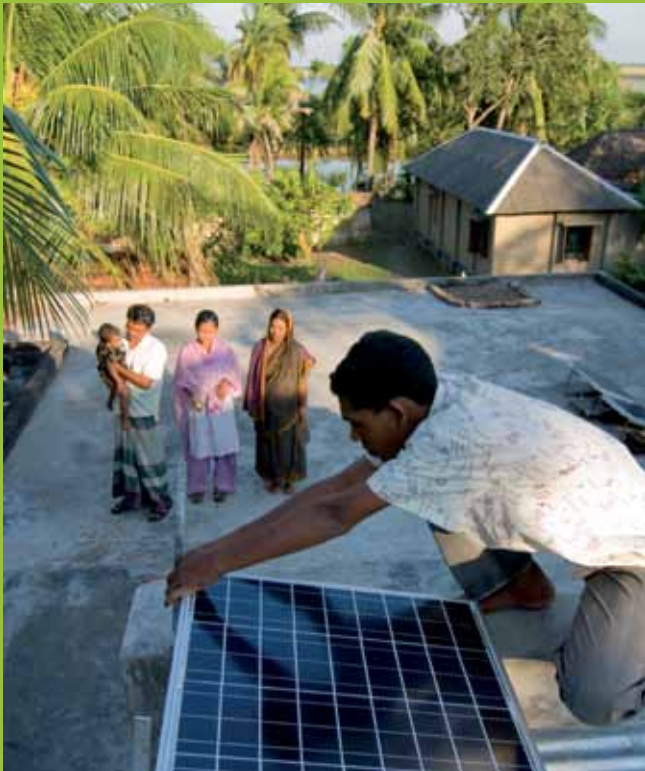
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1 WORKING TOGETHER TOWARDS MEASURING GREEN ECONOMY



This section introduces UNEP's work on green economy and the indicator work conducted by UNEP to date.

The UN Environmental Programme (UNEP) launched its green economy initiative in October 2008 with the aim of providing macro-economic arguments for shifting and mobilising investments at an economy-wide level towards green sectors and to the greening of brown sectors. In November 2011, UNEP published its seminal Green Economy Report (UNEP, 2011), whose main finding was that, compared to investing in a business-as-usual manner, green investments generate greater growth and jobs and provide clean water and energy services to more people while reducing carbon emissions and improving many aspects of the environment in the medium and long terms.

UNEP's initiative and similar others by the UN Economic and Social Commission for Asia and Pacific (ESCAP), the Organisation for Economic Co-operation and Development (OECD), and the Global Green Growth Institute (GGGI), culminated in the endorsement of "green economy in the context of sustainable development and poverty eradication" by the United Nations Conference on Sustainable Development (UNCSD), the Rio+20 Summit in 2012. At Rio+20, it was highlighted that, in order to make the transition towards a green economy, new measures and metrics would be needed to reflect green goals and inspire action (UNEP, 2012). In this context, the development of appropriate indicators is a key priority for UNEP, who has been working with multilateral agencies and other stakeholders to develop a framework for using indicators to support green economy analysis. This includes a joint paper

with World Bank, OECD and GGGI¹ setting out a broad framework for measuring green growth and green economy (GGGI, OECD, UNEP and World Bank, 2013) and a guidance manual for using indicators (UNEP, 2014).

Moving forward, the two priority areas identified for green economy indicator development are those that assess the “greening” of conventional economic activities and those that assess the growing share of “green” or environment-related sectors. The Environmental Goods and Services Sector (EGSS) framework is thus a vital instrument for facilitating the “greening” of the economy. The EGSS framework developed by Eurostat and embedded in the System of Environmental-Economic Accounting (SEEA) Central Framework, which was adopted by the UN Statistical Commission at its forty-third session in 2012, provides descriptions and specifications of activities to be counted as environmental activities. It can be used for estimating the “share of green economic activities” in terms of revenue, value-added, employment and exports. Currently, EGSS is being used in many EU countries and several developing countries, including China, and others in Latin America have begun to adopt some of its variants.

In this context, UNEP hosted a workshop entitled “Measuring ‘Green’ Sectors in a Transition towards a Green Economy” from 14 to 15 November 2011 in Geneva. Its purpose was to facilitate a discussion on the possibilities of and challenges to measuring “greening” progress with Eurostat’s EGSS work as a starting point. There were presentations by Eurostat, UN Statistics Division, UN Economic and Social Commission for Western Asia (ESCWA), OECD and the statistical agencies of Mexico, South Korea, Austria and the Netherlands. Discussions during the workshop focused on questions such as what to include in EGSS and on practical issues of data collection.

The workshop on “Measuring Progress on the ‘Greening’ of the Economy: Policies and Practices”, which was held in Geneva in May 2014 and co-organized by UNEP, Eurostat, the European Environmental Agency (EEA) and the International Labour Organization (ILO), was a follow-up to the 2011 workshop. Its aim was to motivate more widespread application of the EGSS measurement framework and addressed developments in the field. The event brought together a diverse group of stakeholders who shared ideas and helped to elaborate a correct understanding of EGSS-related concepts with a view of aligning EGSS measurement with the SEEA standard. The participants focused on important policy issues such as green jobs and trade opportunities in relation to the EGSS statistics.

The workshop was an opportunity to discuss important challenges, such as how EGSS might be connected to equity issues and addressed inequality as a key part of a green economy, as well as the ways to operationalise the use of EGSS in countries that have not previously used it.

This working paper will scope out the key elements and issues to help to focus on the results of the workshop. Section 2 introduces the EGSS framework and outlines the methodological issues. Section 3 will give an overview of developments in the field in the EU and other countries. The challenges and issues involved in using the EGSS framework are elaborated on in Section 4. Finally, Section 5 aims to draw several conclusions and set the scene for discussions at the upcoming workshop.

2 THE ENVIRONMENTAL GOODS AND SERVICES SECTOR (EGSS)



This section sets out the EGSS framework, with a brief history of its development, its justifications and the main statistical elements of the framework.

2.1 THE BIRTH OF THE EGSS FRAMEWORK

Economic growth has led to the deterioration of the environment. Current resource use and pollution patterns have been recognized to be unsustainable, raising the need of reshaping the patterns of growth. In particular, promoting a “greener” economy could help address environmental problems, stimulate growth, create additional and improved jobs as well as achieve better living conditions.

But what does “greener” mean in this context? Several definitions for this concept have been suggested by various organizations but no commonly accepted

definition has been agreed upon yet. At the same time the demand for indicators and statistics to measure such a “greening” of the economy by policymakers as well as other stakeholders is growing.

Environmental-economic accounting provides a means by which information can be organised to assess the relationship between the economy and the environment and how it changes over time. It helps in understanding the amount of economic activity that can be considered related to the environment. Estimates of this amount indicate the extent to which economic units – governments, enterprises, households – are undertaking activities which are beneficial or less harmful to the environment.

There have been several attempts to define and measure those economic activities, which are

traditionally based on estimates of pollution control and waste management expenditure, or market assessments of the value of relevant products. The so called “environmental (or eco)-industries” have been at the centre of attention, as they are widely seen as a sector with great growth potential, generating wealth and creating jobs as well as playing a major role in the transition of economies towards sustainable development.

This interest has raised a number of questions on different issues related to the measurability of these economic activities. In response to such questions, a significant effort was made by the OECD and the European Commission (EC), which produced the first manual for data collection and analysis of the environmental industry (OECD and Eurostat, 1999). Around this time, several studies became available between 1997 and 2006 from individual EU Member States and at the EU level (e.g., ECOTEC, 1999; Ernst & Young Environment and Sustainability Services, 2006; and ECORYS, 2009). These studies investigated methods of collecting data, possible sources for identifying an environmental enterprise and basic concepts of the environmental sector. They offered, as well, the first attempts to measure eco-activities.

In the meantime, the issue of the environmental sector found its place also in the United Nations System of Environmental Economic Accounting (SEEA). In its chapter 5, the 2003 SEEA provided a summary (paragraphs 5.86 to 5.94 and 5.168 to 5.189) on accounting for economic activities and products related to the environment (UN Statistical Division, 2003).

In order to respond to policy interests and to help implement future policy measures directed towards the environmental sector, Eurostat took up the

challenge to develop a manual for collecting data on the sector. A Eurostat handbook providing definitions, data collection methodologies and examples was released in 2009 (Eurostat, 2009) and European countries started regular data collection based on the framework designed by this manual.

EGSS was incorporated in the UN System for Integrated Environmental-Economic Accounting, which was revised and became an international statistical standard (UN Statistical Division, 2012). The 2012 SEEA central framework now includes the EGSS statistics in chapter 4 (in particular paragraphs 4.92 to 4.120).

Moreover, EU countries have started voluntary reporting on EGSS based on a common template for data transmission (standard tables) and other countries around the world are currently testing the feasibility of producing EGSS statistics. The EC has adopted a regulation on EGSS accounts reporting, where countries will be required to report on EGSS according to an agreed template by 2016. Eurostat has gone further in developing its framework for eco-industry data collection, recently completing a practical guide towards the compilation of EGSS statistics and planning to update the 2009 handbook and producing EU estimates for the eco-industry.

2.2 OVERVIEW OF THE MAIN STATISTICAL ELEMENTS

The EGSS framework, as set out in Eurostat's 2009 manual, consists of a set of producers of goods and services (and thus also technologies), contributing to one or both of the following activities:

- preventing, reducing and eliminating pollution and any other degradation of the environment;
- preserving and maintaining the stock of natural

resources and hence safeguarding against depletion.

According to this framework, environmental products and producers are classified into two main groups:

1. Environmental protection (EP), which includes products of both a preventive or remedial nature for the prevention, reduction, elimination and treatment of air emissions, waste and wastewater, soil and groundwater contamination, noise and vibration, as well as radiation and the prevention, reduction and elimination of soil erosion and salinity, and other kinds of degradation, preservation of biodiversity and landscapes, as well as the monitoring and control of the quality of environmental media and waste.
2. Resource management (RM), which comprises products to manage and/or conserve the stock of natural resources against depletion phenomena, including both preventive and restoration activities as well as the monitoring and control of the levels and uses of natural resource stocks.

The scope of these two groups is defined according to the classification of environmental protection activities (CEPA) and the classification of resource management activities (CReMA). Both classifications are supposed to be mutually exclusive so that all production in EGSS should fit into only one of the 16 different categories.

The CEPA is a generic, multi-purpose, functional classification for environmental protection. It is used for classifying environmental protection activities, but also products, expenditures and other transactions. It is a recognised international standard included in the family of international economic and social classifications. It is structured as follows:

CEPA 1 Protection of ambient air and climate, of which:

CEPA 1.1.2 and 1.2.2 Protection of climate and ozone layer

CEPA 2 Wastewater management

CEPA 3 Waste management

CEPA 4 Protection and remediation of soil, groundwater and surface water

CEPA 5 Noise and vibration abatement

CEPA 6 Protection of biodiversity and landscapes

CEPA 7 Protection against radiation

CEPA 8 Environmental research and development (R&D)

CEPA 9 Other environmental protection activities

A detailed description of the CEPA classification including examples of environmental protection activities can be found in the SEEA 2012, in the 2009 EGSS handbook and on Eurostat's RAMON metadata server.²

There are no existing internationally agreed standard classification for resource management activities yet. However, the CReMA developed by the EGSS task force is in use for EGSS purposes. Like CEPA, the CReMA is a generic, multi-purpose, functional classification for environmental protection. It is structured as follows:

CReMA 10 Management of water

CReMA 11 Management of forest resources, of which:

CReMA 11.A Management of forest areas

CReMA 11.B Minimisation of the intake of forest resources

CReMA 12 Management of wild flora and fauna

CReMA 13 Management of energy resources, of which:

CReMA 13A Production of energy from renewable resources

CReMA 13B Heat/energy saving and management

CReMA 13C Minimisation of the use of fossil energy as raw materials

CReMA 14 Management of minerals

CReMA 15 Research and development (R&D) activities for resource management

CReMA 16 Other resource management activities

A detailed description of the CReMA including examples of resource management activities can be found in the 2009 EGSS handbook. The SEEA presents a slightly different classification of resource management activities which rearranges the CReMA categories (UN Statistical Division, 2012) and is presented in Annex I. Nevertheless, this is just a starting point for the compilation of relevant statistics as further testing and development is required (cf. Eurostat on classifications (Eurostat, 2012a)).

The first and most important criterion for a product to be classified as an environmental good or service is that its prime objective is environmental protection or resource management, whereby the primary objective is mainly determined by the technical nature of the product (the terms “main purpose” or “primary purpose” or “end purpose” are used interchangeably).

The producer’s intention should be the criterion for handling boundary cases. The producer’s intention means the producer’s awareness of the environment-friendly characteristics, his or her awareness of the use of the product and his or her awareness of the environment-related markets, to which the output is addressed. In practice, particularly in the case of EGSS surveys, the producer’s intention may be the main criterion for identifying environmental goods and services.

Following the 2009 EGSS handbook (Eurostat, 2009), some categories of environmental products could be distinctly identified: environmental specific

(or “characteristic”) products, connected (or environmental “sole-purpose”) products, adapted (or “cleaner and resource-efficient”) products, end-of-pipe technologies, and integrated (or “cleaner and resource-efficient”) technologies.

Environmental specific (or “characteristic”) products are goods and services produced in principal, secondary or ancillary activities that are typical for EP and RM, e.g., waste and wastewater services, energy and water saving, production of energy from renewable sources, management of pollution, repair of environmental damages, measurement and control activities for EP and RM, R&D, education and training related to EP and RM.

Connected (or environmental “sole-purpose”) products are goods or services directly serving an EP or RM purpose and having no other use than EP or RM, but not being output of characteristic EP and RM activities, e.g., catalytic converters, rubbish containers, septic tanks, installation of environmental technologies and products, components of resource management technologies. These products are often classified under broader categories than the environmental specific products, which can frequently be identified as specific categories of the economic activity and product classifications.

Adapted (or “cleaner and more resource-efficient”) products are more environmental-friendly or less polluting products when produced, used or scrapped than equivalent normal products furnishing a similar utility (e.g., organic farming products, mercury free batteries, vehicles with lower air emissions), or less resource depleting, more resource-efficient products when used compared to equivalent normal products furnishing a similar utility (e.g., resource-efficient appliances).

End-of-pipe technologies are mainly technical installations and equipment for control, measurement, treatment of pollution, resource degradation and depletion, e.g., facilities for specific environmental services such as sewage and waste treatment facilities, filters, incinerators, equipment for the recovery of materials, for measuring air pollution, or resource depletion, containments of high-level radioactive filters.

Integrated (or “cleaner” and “resource efficient”) technologies are technical processes, methods, and knowledge used in less polluting and less resource intensive technology than the equivalent average technology used by national producers, e.g. facilities that allow the production of renewable energy, such as wind and hydroelectric turbines, solar panels, combined heat and power, dry ovens in the cement industry, etc.

The EGSS framework aims at compiling data for the following economic variables (Eurostat, 2014a):

- **Output**, which consists of those produced goods or services that become available for use outside the producer unit, any goods and services produced for own final use and goods that remain in the inventories at the end of the period in which they are produced. The EGSS output also includes ancillary output. Market output is to be measured at basic prices.³ Output for own final use is to be valued at the basic prices of similar products sold on the market or by the total costs of production. Other non-market output is to be estimated by the total costs of production.
- **Gross value-added**, which represents the contribution made by these activities towards gross domestic product (GDP). It is the difference between the value of the output and intermediate consumption.

— **Employment**, to be measured by the full-time equivalent employment engaged in the production of the environmental output as defined above. The full-time equivalent is the number of full-time equivalent jobs, defined as total hours worked divided by average annual hours worked in full-time jobs.

— **Exports**, consisting of sales, barter, gifts or grants, and goods and services from residents to non-residents.

Output and employment data are indicators widely used for analysing economic sectors and for monitoring their performance and growth. Gross value added is mainly used to compare the income added by the EGSS to the national income. Export data are important for the evaluation of the competitiveness of an economic sector within the global economy.

Data should be broken down further into three types: environmental and resource domains (using CEPA/ CReMA) and industry (using the NACE classification).

These three types of breakdown, together with the temporal dimension, offers the data user a great number of details on EGSS and the possibility to build indicators using both EGSS and national accounts data, given the fact that the EGSS data is consistent with the national accounts definitions.⁴

2.3 DATA SOURCES

Statistics on the EGSS can either make use of the already existing information in accounts and statistics or can be based on surveys, administrative sources, and statistical estimations.

Existing accounts and statistics which can give readily exploitable information are national accounts, environmental expenditure statistics and accounts,

structural business statistics, industrial commodity statistics, labour statistics, trade statistics, agriculture statistics, energy statistics, business registers and VAT registers.

Table 1 presents, in general, the main sources of data (from existing statistics and accounts) for each of the economic variable reported in the table. The use of each source can be sometimes limited to some producers and not to the entire population of the EGSS.

In practice, statistical offices have adopted a number of methods to compile EGSS statistics. According to the taxonomy used, these methods can be classified as follows: selection of activities approach, selection of businesses approach, selection of products approach, use of demand side information and use of survey-based data (UN ESCAP, 2013).

Direct surveys of EGSS producers are conducted in very few countries on a regular basis (Germany and Canada being the main examples). However, in several countries, there are some specific data sources that are used for EGSS purposes, such as data from trade associations, surveys of specific EGSS sub-sectors undertaken by economic or environmental ministries, or administrative databases of EGSS companies that receive investment grants or subsidies (e.g., renewable energy subsidies).

TABLE 1. EGSS MAIN SOURCES OF DATA FROM EXISTING STATISTICS AND ACCOUNTS

Sources/Variables	Turnover value-added	Employment	Exports
Structural business statistics	✓	✓	
Industrial commodity statistics	✓	(estimation from the value of production sold) ✓	
Labour statistics		✓	
Trade statistics			✓
VAT registers	✓		✓
National accounts (balance of payments)			(services) ✓
National accounts (others)	✓	(estimation from input/output tables) ✓	(supply and use tables, only products and activities entirely environmental) ✓
Environmental protection expenditure accounts (EPEA, Joint Questionnaire)	(services) ✓	(services only specialised producers) ✓	(services) ✓

Source: Eurostat (2012b).

3 RECENT DEVELOPMENTS AND APPLICATIONS



This section presents the main developments in the field, particularly since the last UNEP workshop in 2011. This includes how frontrunner countries, such as those in the EU, have applied the EGSS framework, as well as the efforts of countries outside the EU, such as China, in this area. This includes an overview of the framework in relation to policy issues such as green jobs and trade.

3.1 EUROPEAN UNION

The EU is the frontrunner in the field of EGSS statistics. The most recent and important developments are the inclusion of an EGSS module into Commission Regulation (EU) 691/2011 on European environmental economic accounts, which will dramatically increase the availability of EGSS data, the production of EU28 figures by Eurostat

and the kick-off of a revisionary process of the EGSS methodological framework aiming at reducing its complexity and bringing about full consistency between the EGSS, the other environmental economic accounting modules (environmental protection expenditure, environmental subsidies, environmental taxes just to cite a few) and the European System of National and Regional Accounts (ESA).

3.1.1 EU'S PROPOSED REGULATION ON ENVIRONMENTAL ECONOMIC ACCOUNTS

In order to extend the national accounts to key aspects of sustainable development using integrated environmental economic accounts, which provide fully consistent data, the EU set out a Regulation (European Commission, 2011). It covers three modules of environmental accounts: air emission

TABLE 2. ILLUSTRATION OF THE EGSS MODULE LEGAL PROPOSAL FOR AMENDING THE COMMISSION REGULATION (EU) 691/2011

	Environmental domains													
	CEPA							CReMA						
	1	2	3	4	5	6	7+8+9	10	11	13			14	12+15+16
										Total	13A	13B		
Industries (NACE) A*21 = ISIC sections														

Source: Eurostat, 2012b.

accounts, environmental taxes and material flow accounts.

This Regulation establishes a common framework for the collection, compilation, transmission and evaluation of European environmental economic accounts. The purpose is to set up environmental economic accounts as satellite accounts to the ESA by providing methodology, common standards, definitions, classifications and accounting rules intended to be used for compiling environmental economic accounts.

Article 10 of the Regulation contains a list of possible new modules to be introduced later, based on Commission proposals. The European Commission has proposed to the European Council and Parliament to amend the existing Commission Regulation (EU) 691/2011 by adding three new modules, including one on EGSS.

The new EGSS module would require Member States to provide data on EGSS market activities: output, value added, exports and employment in a breakdown by 21 industry groupings (basically the letter or sections level of NACE/ISIC) and by 14 environmental domains following CEPA and CReMA.

Discussions at Council and European Parliament level are nearly complete. The legislative procedure to amend Regulation 691/2011 could result in the entering into force of the amending Regulation in 2014. The first year of data mandatory reporting for the new modules would be 2017.

Table 2 presents an overview of the legal proposal which asks for output, exports, value-added and employment of the EGSS by industries and environmental domains. The legal proposal includes a reduced NACE breakdown (NACE A*21 instead of the NACE A*64 used so far for voluntary reporting) and a reduced number of environmental protection and resource management domains (some CEPA and CReMA classes were aggregated for facilitating data collection).

3.1.2 REFINEMENT OF METHODOLOGIES PROPOSED IN THE 2009 HANDBOOK

Although more and more data on the EGSS have been made available by EU countries in the past years, there is still a lack of systematic data to assess the contribution of EGSS to the total economy and its employment potential. In addition, Eurostat recognized a need for a less fragmented and more

complete database that allows EU aggregates to be calculated.

In this regard, Eurostat has developed a guide that presents practical methods towards compiling EGSS statistics (Eurostat, 2014b). This guide, which was the result of a peer review process during the second half of 2013, is meant to be a working document for national statistical institutes to help them with data compilation.

The solutions proposed in this guide are simple approaches: they are oriented towards already existing statistics and their use for compiling EGSS statistics. The description of how to overcome a data compilation problem can be a starting point for creating individual solutions at country level. Some more refined methods are offered as well.

The guide also offers simplifications of concepts and terms used in Eurostat's 2009 EGSS handbook. The simplifications are pragmatic solutions to implement the 2012 SEEA.

Eurostat plans to continue working on solving and clarifying methodological issues related to EGSS in line with the advance of the EGSS legal module.

3.1.3 REGULAR DATA COLLECTION IN SOME EU COUNTRIES AND AVAILABILITY OF EU AGGREGATES

So far, the data have been collected on a voluntary basis. In 2009, after the publication of the handbook on the EGSS framework, Eurostat launched a pilot data collection. The first official EGSS data collection was launched two years later, in 2011. The second official data collection was presented in February 2013, with a deadline set on 28 June 2013. The data reported by countries are published in the database on

the Eurostat website and presented in the "Statistics explained" section of the Eurostat website⁵ (Eurostat, 2014a).

Data are currently available for 16 countries and for the period 2004-2011 (different from country to country in terms of years covered). It must be noted that at present not all country totals comprehensively cover all types of activities and all environmental/resource domains (Eurostat, 2014a).

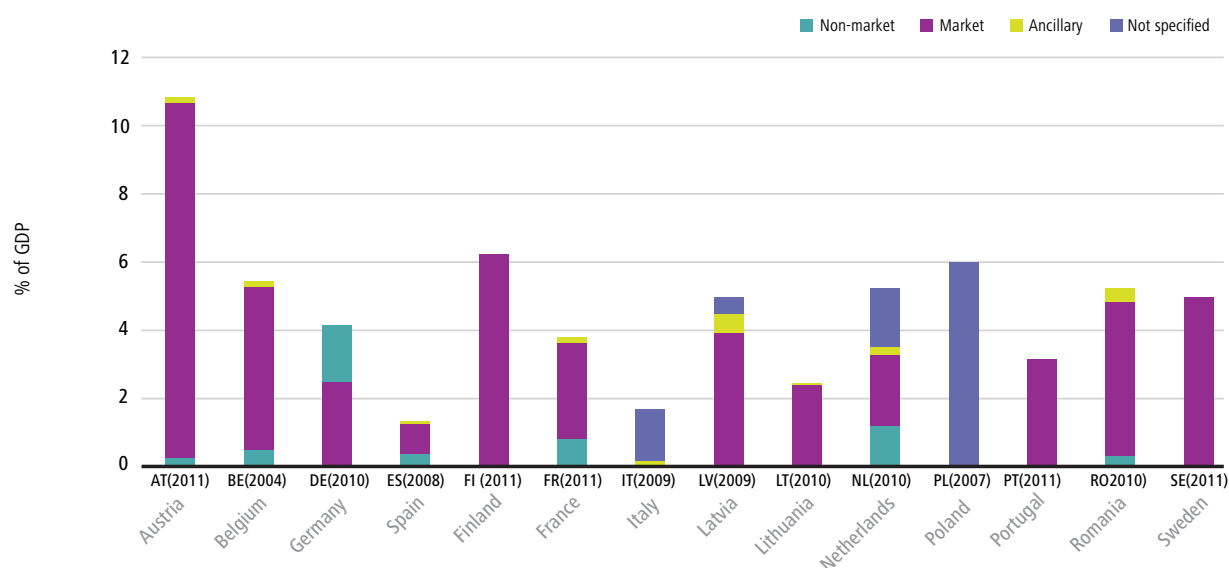
Countries regularly producing comprehensive EGSS statistics - i.e. statistics that cover all or most of the EGSS as defined in the SEEA 2012 - include Austria, France, Germany, the Netherlands and Sweden, who publish these comprehensive estimates as part of their regular statistical activities.

As reported by Eurostat (Eurostat, 2014a), while data are not yet strictly comparable, in most of the European countries for which data are available EGSS output ranged between 1.8 per cent (Spain, 2008) and 11.3 per cent (Austria) of GDP (see Figure 1).

In all countries, output associated with waste and wastewater management and the management of energy resources make up most of the EGSS market output. The differences in RM activities between countries are, to a large extent, due to differences in coverage of the environmental products included in the data collection (for example. Italy reported only the output for management of water, while Austria included all RM output), as can be seen in Figure 2.

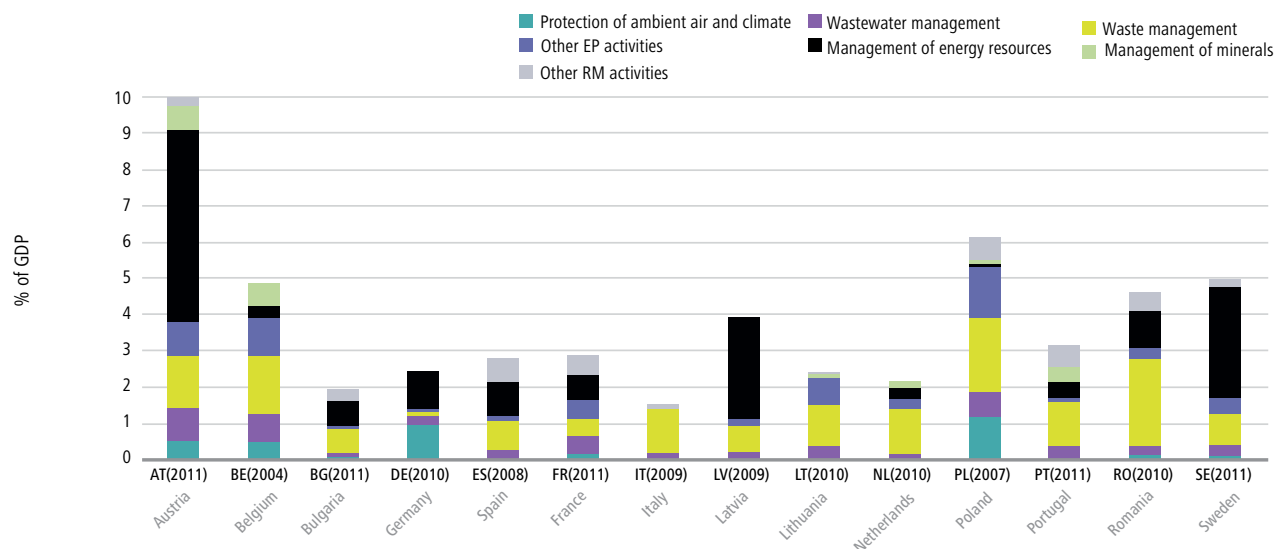
For the 2013 EGSS data collection, Eurostat received data from 14 countries: Austria, Bulgaria, Czech Republic, Germany, Greece, Finland, France, Latvia, Lithuania, Malta, the Netherlands, Portugal, Romania and Sweden. Data coverage and quality differ across countries. As summarised by Eurostat (Eurostat,

FIGURE 1. EGSS OUTPUT BY MARKET, NON-MARKET AND ANCILLARY ACTIVITIES, LATEST AVAILABLE YEAR (% OF GDP)



Source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Environmental_goods_and_services_sector

FIGURE 2. EGSS MARKET OUTPUT BY ENVIRONMENTAL DOMAIN, LATEST AVAILABLE YEAR (PER CENT OF GDP)



"Other EP activities" include: protection and remediation of soil, groundwater and surface water; protection of biodiversity and landscapes; protection against radiation; noise and vibration abatement; R&D and other environmental protection activities

"Other RM activities" include: management of water, forests, wild flora and fauna; R&D for RM activities and other resource management activities

Austria is the most complete in terms of coverage of environmental domains and industries

Italy includes only waste, wastewater and water management

Germany reports partly the output related to the production of renewable energy (only the production of fuels from biomass is included)

Source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Environmental_goods_and_services_sector

2014c), half of the 2013 reporting countries provided data for all four variables requested in the EGSS questionnaire: output, gross value added, employment and exports. Five countries did not provide any data on value-added, four did not fill in the exports sheet, while only two did not give any information on employment.

Most of the countries found data sources for CEPA domains, while only a few managed to find sources for CReMA domains. Eurostat explains that “this is due to the fact that statistics and accounts for environmental protection exist since a long time, either voluntary (environmental protection expenditure, targeted surveys, etc.), or mandatory (structural business statistics, industrial commodity statistics, etc.)” (Eurostat, 2014c). Among CEPA domains, wastewater management, waste management and protection of soil and ground water were filled in by the majority of countries. For CReMA domains, renewable energy and water management were the ones mostly filled in by the countries, although still the overall coverage for CReMA is quite low.

In 2013, Eurostat also worked on the design and implementation of estimation procedures for EU EGSS aggregates, developing gap filling methods for the EGSS variables based on already existing data in other statistical domains (and available at European level), such as environmental protection expenditure accounts, national accounts, structural business statistics, energy statistics, agricultural statistics, and other publicly accessible sources. Suitable procedures for a stepwise integration and overlay of available sources for gap filling EGSS variables were developed. These procedures are described in the EGSS practical guide (Eurostat, 2014b).

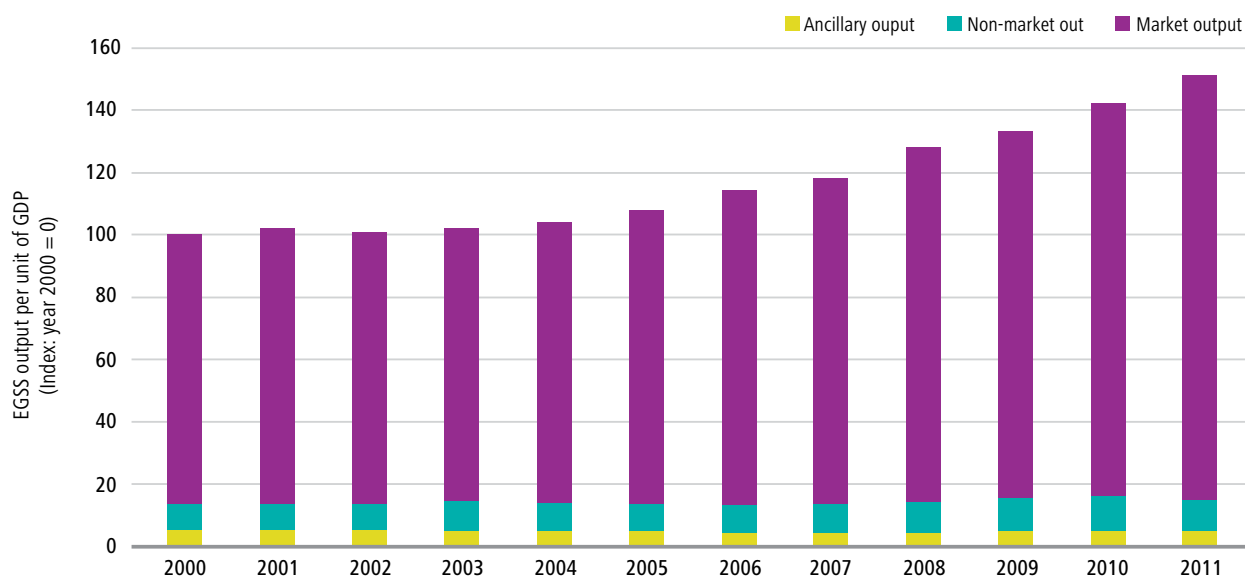
Eurostat plans to regularly update and revise the EU28 data in order to include the latest updates of the source

of data and to stepwise introduce methodological improvements. Figures 3 and 4 offer an overview of the results of the EU aggregates calculation.

For some parts of the EGSS (as for example waste management services), EU estimates make direct use of existing data from the national accounts or business statistics. For other parts, the figures rely on indirect estimates of EGSS activities. These estimates may be based on demand side data such as environmental expenditure or investment, which are used to derive the output of the relevant environmental goods and services. Price times quantity methods were used for other areas, e.g., estimating organic farming activities based on hectares of land under organic agriculture or the production of renewable energy based on physical quantities of renewable energy produced.

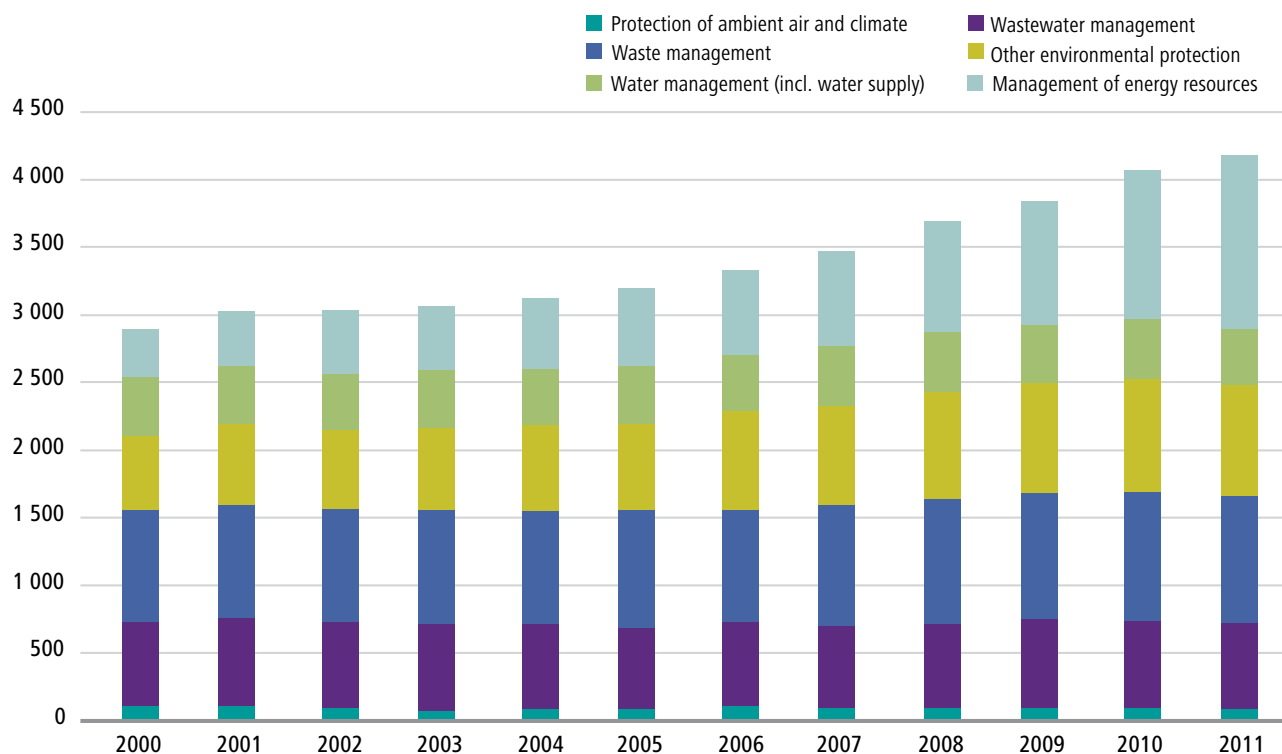
Employment figures cover the same activities covered by EGSS output. Thus, figures do not include indirect employment related for example to the production of non-EGSS products used as intermediate inputs for EGSS production. Eurostat has estimated EGSS employment broken down by industries and environmental activities from EGSS output linked with national accounts information on the ratios between compensation of employees and output and labour compensation rates per FTE as explained in (Eurostat, 2014b). This approach is based on the assumption that the average labour compensation rates and intensities for an industry are sufficiently precise indicators for the EGSS activities within the same industry. The results of this estimation are shown in the Figure 4.

FIGURE 3. TRENDS IN EGSS TOTAL OUTPUT AND BREAKDOWN BY MARKET, NON-MARKET AND ANCILLARY ACTIVITIES FOR EU28



Source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Environmental_goods_and_services_sector

FIGURE 4. EGSS EMPLOYMENT FOR EU28 ('000 FULL-TIME EQUIVALENTS)



Source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Environmental_goods_and_services_sector

3.2 COUNTRIES OUTSIDE EUROPE TESTING THE EGSS FRAMEWORK

3.2.1 UNITED STATES AND CANADA

Studies and research on the environmental sector have also been undertaken in the United States and in Canada. For example, the United States Department of Commerce has estimated EGSS (US Department of Commerce, 2010), while the United States Department of Labour released a study on the employment in the “green” goods and services sector in 2013 (US Department of Labour, 2012).

Canada has measured environmental goods and services for many years. Work began in the late 1990s with the publication of estimates on the ‘environment industry’ in Canada. More recently, the programme underwent a review and the statistics produced today are more focused on a specific set of industries providing environmental goods and services. The pilot Survey of Environmental Goods and Services was conducted in 2008, followed by a second survey in 2010. Work continues on the 2012 reference year survey that is being currently carried out.

The survey is focused on a smaller array of environmental goods and services covering the following categories:

- Renewable energy production;
- Management of non-hazardous waste;
- Management of industrial air pollution or flue gas;
- Industrial wastewater treatment and municipal sewage treatment;
- Remediation of ground water, surface water and leachate;
- Remediation of soil, sediment and sludge;

- Site remediation services and environmental emergency response services; and
- Revenues generated through exports.

Revenues derived by Canadian businesses from sales of environmental goods and services totalled US\$3.9 billion in 2010, of which just under US\$2.2 billion were derived from sales of goods (only produced by the manufacturing sector), and US\$1.7 billion from sales of services. Slightly more than 41 per cent of the revenues from environmental goods were generated through sales of machinery, equipment and products for renewable energy production. Fifty-eight per cent of total sales of environmental services were derived from environmental consulting services, which amounted to US\$ one billion. Exports amounted to US\$712 million with the majority (82 per cent) going to the United States (Statistics Canada, 2014). The revenue by category of product is shown in Figure 5.

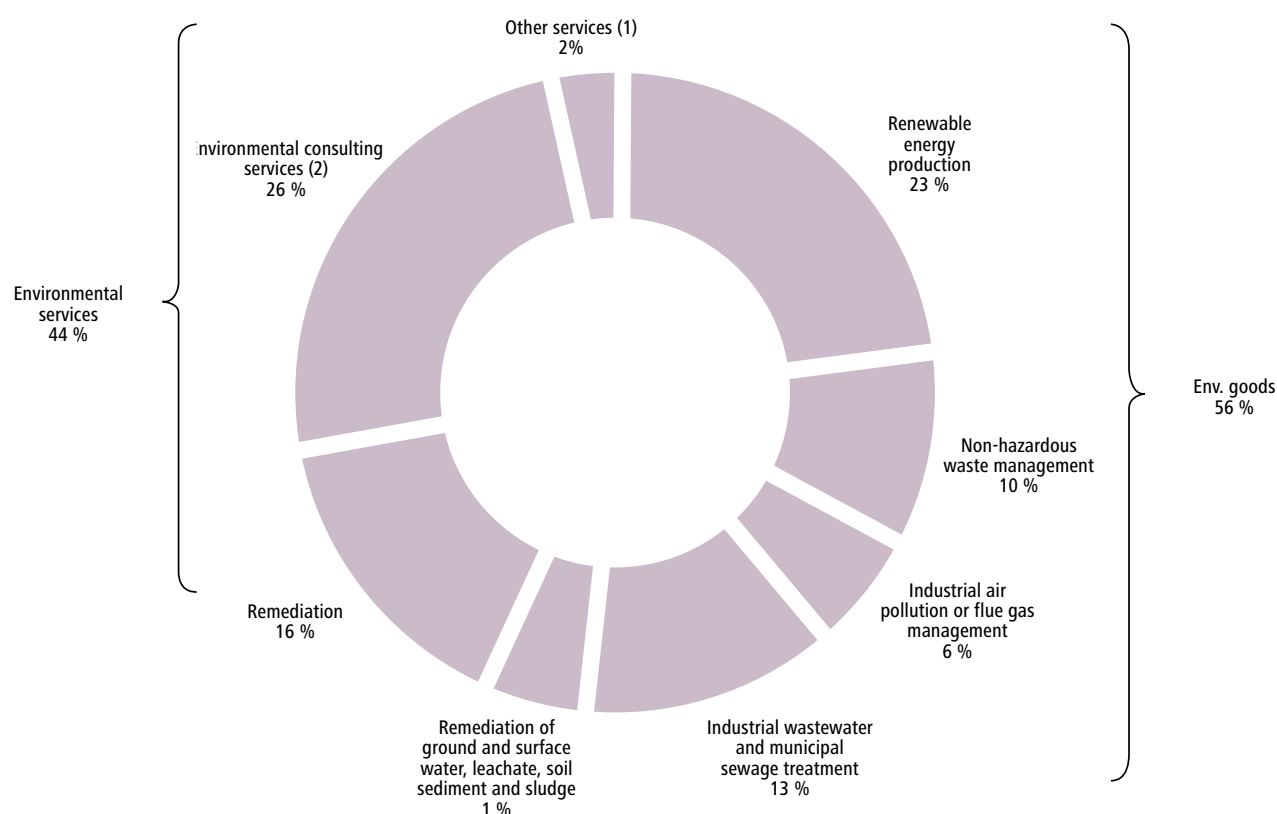
Future work will focus on the integration of environmental protection expenditures, EGSS and on clean technologies.

Statistics Canada is also working with other federal partners to define the technologies that make up ‘clean tech’ and the industries where these activities take place. Work is also underway to compile a list of businesses in Canada that produce or supply clean technologies.

3.2.2 AUSTRALIA

According to the Australian Bureau of Statistics (ABS, 2013a), Australia has not yet developed a comprehensive framework for EGSS. In fact, with regards to environmental monetary accounts, neither the environmental protection expenditure accounts nor an environmental goods and services sector account are produced by the ABS at present.

FIGURE 5. REVENUE FROM SALES OF ENVIRONMENTAL GOODS AND SERVICES, CANADA, 2010 ('000 CAD)



(1) Includes revenues for the following: in situ and ex situ remediation of soil, sediment, and sludge; in situ and ex situ remediation of ground and surface water and leachate; remediation of air or off-gas; control, containment and monitoring services (air, water, soil); and environmental emergency response services

(2) Environmental assessments; environmental audits; site remediation planning services; natural resource management consulting services; waste management consulting services; environmental policy development consulting services; and other environmental consulting services

Source: Statistics Canada, Survey of Environmental Goods and Services http://www.statcan.gc.ca/daily-quotidien/130605/t130605c002-eng.htm#t002Note_3 and <http://www.statcan.gc.ca/daily-quotidien/130605/t130605c001-eng.htm>

Nevertheless, although no recent and comprehensive data for these activities are available, information is available for various categories of environmental protection expenditure, such as air emission management activities, environmental research and development, and recovery of landfill emissions for economic uses.

Other information relevant for the EGSS can be found in waste, water and energy accounts which report also monetary figures related to physical flows as for example the amount of the supply of waste management services (ABS, 2013b) and R&D expenditure in energy (ABS, 2013).

3.2.3 CHINA

In November 2012, the Chinese Academy for Environmental Planning under the Ministry of Environmental Protection started a project aimed at identifying the feasibility of applying the EGSS statistical framework in China.

The study analysed the similarities and differences between the EGSS framework and China's current statistical practices on environmental industries. A broad range of published statistics have been examined to compile national data and a pilot data collection using China's own environmental industry

survey has been conducted in the city of Wuhan. The study found that China's current published statistics can hardly provide consistent, detailed and reliable data for compiling EGSS statistics due to the lack of emphasis on environmental industry accounting and the differences in product classification and data collection approaches.

Nonetheless, China's own Environmental Industry Survey can provide valuable information for EGSS data collection, and the data can be extracted from the survey by linking the product code with EGSS classification. The pilot study in Wuhan showed the feasibility of this method, even though there remain many technical challenges to be addressed.

3.2.4 KOREA

Since 2000, Statistics Korea has reported EGSS related data in the Report on the Environment Industry Survey using surveys with annually published results. The survey does not cover the entire spectrum of the EGSS and focuses on pollution management and only certain aspects of resource management.

Statistics Korea also undertook collection work for their Green Industry Statistics, including specific questions on green activity in the 2010 Economic Census. These statistics have a scope similar to EGSS, but also include enhanced coverage of energy efficiency and resource efficiency related products and activities.

3.3 WORK OF INTERNATIONAL ORGANIZATIONS ON MEASURING GREEN ECONOMY

Different international organisations (ILO, OECD, UNEP and WTO, to cite a few) have been working on "green" economy-related issues, focusing on different facets, such as jobs, growth, trade, etc.

To respond to the need for harmonised concepts and methodologies related to green jobs statistics and to assess the extent to which the economy and labour market are responding to various public policies and initiatives, the ILO has been working on a statistical definition of green jobs and jobs in the environmental sector. A proposal for guidelines concerning measurement of employment in the environmental sector and green jobs was discussed at the 19th International Conference of Labour Statisticians (2-12 October 2013), when a revised version of the guidelines was adopted on 9 October (ILO, 2013).⁶

The guidelines define the environmental sector as consisting of all economic units producing, designing and manufacturing at least some goods and services for the purposes of environmental protection and resource management. Such environmental activities can be carried out by all economic units, as main, secondary or ancillary activities. More importantly, the guidelines draw a distinction between employment in the production of environmental goods and services for consumption by other economic units (i.e. employment in production of environmental outputs) and employment for consumption by the economic unit in which the activity is performed (i.e. employment in environmental processes). Green jobs are specifically referred to as a subset of employment in the environmental sector, meeting the requirements of decent work, including adequate wages, safe conditions, workers' rights, social dialogue and social protection.

While the definition of the environmental sector is the same as in the SEEA, ILO focuses on guidance for defining and measuring jobs, putting forward the distinction between jobs involved in the production of environmental output and jobs involved in environmental processes.

The concepts and definitions concerning measurement of employment in the environmental sector and green jobs adopted by the 19th ICLS have been tested in Albania.

The OECD for its part has established a set of indicators for monitoring progress towards green growth. In its 2012 report, OECD presented a conceptual framework, a proposal for developing green growth indicators and the results for selected indicators derived from OECD databases.

On 25 January 2014, a group of WTO member countries, including the United States, the EU, Australia and Canada, launched a new set of negotiations to eliminate tariffs on a set of “environmentally beneficial products” (Australia et al., 2014).⁵

The negotiations will build on the work of the 21 countries that make up the Asia-Pacific Economic Cooperation (APEC). In 2012, the 21-member APEC countries agreed to reduce or eliminate tariffs by the end of 2015 on a list of 54 “environmentally beneficial” products.

The APEC List of Environmental Goods⁶ includes 54 environmental goods, including core products such as:

- Renewable and clean energy technologies, such as solar panels, and gas and wind turbines;
- Wastewater treatment technologies, such filters and ultraviolet (UV) disinfection equipment, on which tariffs in the region are currently as high as 21 percent;
- Air pollution control technologies, such as soot removers and catalytic converters,;
- Solid and hazardous waste treatment technologies, such as waste incinerators, and crushing and sorting machinery;
- Environmental monitoring and assessment equipment, such as air and water quality monitors, and manometers to measure pressure, and water delivery systems.

4 ISSUES AND CHALLENGES



This part includes discussions on the coverage of the EGSS (economic activities/sectors, parts of the production chain, measurement of ‘cleaner’ products and technologies, definition of green jobs, etc.), practical issues related to data collection aspects (frequency of collection, methods and practical questions on costs of data collection, what are the core sectors to focus on, etc.) and how to make EGSS more relevant to policymakers.

4.1 WHAT IS THE SCOPE OF THE “GREEN ECONOMY”? HOW CAN EGSS DATA BE INTERPRETED BY POLICYMAKERS?

EGSS statistics show the part of green economic activities on the economy without any further implications on how this was achieved and what its effects are on the whole economy. Nevertheless,

EGSS can help in understanding the implications of implementing green economy policies on growth, employment, etc. As they are consistent with national accounts data, indicators and macroeconomic analysis can be realised based on EGSS statistics.

One of the challenges is to understand the boundaries of the EGSS and its relevance to green economy. Some studies, as for example Economic radar of the sustainable energy sector in the Netherlands (CBS, 2012) suggest that the scope of green economy is sometimes understood to extend well beyond EGSS, including all the inputs to EGSS activities, to involve all kinds of “clean” technologies and “clean” and low carbon products. At the same time, some areas covered by EGSS (e.g., waste collection and wastewater management) are not considered to be “green” enough.

Another challenge is the use of data for policy decisions. EGSS gathers important information for policymakers on one part of green economy (e.g., in terms of turnover and employment). It also provides detailed information products, such as what are the contributions of different economic sectors and which environmental domains contribute more or less to the greening of the economy. However, as the implications of, for example, supporting some of the EGSS activities on the whole economy, cannot be analysed by relying solely on EGSS data, the latter may be an insufficient bases for taking environmental policy decisions.

4.2 WHAT ACTIVITIES SHOULD BE COVERED?

The EGSS framework is based on a definition of activities, which relate to environmental protection and resource management. Some issues linked to EP and RM related activities are still being debated among statisticians. With regards to RM activities, for example, there has been agreement to only include activities related to non-cultivated resources and to exclude resource use. But for certain resources, such as forests and water, the supply and distribution seem to have a special place between resource use and resource management. With regards to water management, France and Italy, for example, tested some estimation methods for excluding water distribution from the scope of EGSS.

The EGSS excludes activities related to natural hazards such as activities aimed at reducing the risks from climate change. Nevertheless, the experience of some countries has shown a close link between managing some natural resources and minimising the risks of natural hazards. This is the case, for example, of the Netherlands where water management is strictly related to activities reducing the risks from raising waters.

The scope of EP and RM activities is described and clarified through the CEPA and CReMA classifications. In the case of CReMA, natural resources are used as main headings. As pointed out in (Constantino et al., 2013) this approach is logical from a resource perspective, but does not align well with the basic principle of ISIC/NACE to group activities based on the character of products, their uses and the technical similarity of production processes. For example, the activities designated as ‘materials recovery’ (ISIC Rev. 4/NACE Rev. 2 group 38.3) and ‘wholesale of waste and scrap’ (NACE Rev. 2 class 46.77) relate to protecting several natural resources (forests, minerals, fossil energy, etc.).

Splitting data by natural resources requires that already detailed data (NACE/ISIC 3 or 4 digit activities) have to be split up and assigned to several 1-digit headings of the resource management classification. This reduces data quality as further layers of estimation have to be added. In practice, many countries are able to report materials’ recovery activities as national accounts and business statistics provide sufficient information on ISIC Rev. 4/NACE Rev. 2 group 38.3, but very few are able to classify such activities by resource domain. In Europe, the EC and a small group of countries have looked into this issue and concluded that over the long term the existing classification of resource management should be reviewed. An alternative put forward by the experts participating in a task force (Eurostat, 2012a) could be to base the 1-digit layer of the classification of resource management on a combination of resources and similarity of activities (such as recycling, renewable energy, etc.) and to introduce natural resources as a 2-digit layer where useful. But given the relatively limited practical experience, it was too early to finalise a proposal to replace the current CReMA.

4.3 HOW TO MEASURE CLEANER AND MORE RESOURCE EFFICIENT PRODUCTS

The EGSS framework includes products which are “cleaner” and “more resource efficient” with respect to products which furnish similar utility. An example is energy-efficient household appliances (i.e. washing machines). Experiences at the country-level have proven that the measurement of such products can be very difficult and expensive.

Furthermore, the definition itself of these products creates problems related to comparability over time and across countries. In fact, when standards are redefined (i.e. the energy label) the boundary between environmental and normal products is shifted.

The comparison with “similar utility” for the selection of “cleaner” and “more resource efficient” products might cause a problem in the case of international harmonization and comparability: for instance, if a country with already very high environmental standards (i.e. water-based paints are standard and therefore not included) is compared to countries with low environmental standards (i.e. water-based paints are the exception and therefore included). The higher the overall environmental standard of an economy is, the less room there is for these products that are better than the similar utility, hence the smaller the calculated EGSS gets. With progress towards the perfect green economy, the “cleaner” and “more resource efficient” products share would tend to be zero.

Constantino et al., (2013) also point to doubts about the usefulness of information on turnover or employment related to the production of the share of such products that are cleaner or more resource-efficient.

Many countries have considered the challenge of determining which goods should be included as “cleaner” and “more resource efficient” products to be too difficult and, as a result, they are left out of the scope of most EGSS measurement exercises. For this part of the EGSS, the most important advancement would be to set up a common list of products in order to complete and fully harmonise data collection from different countries. Another solution (which has been successfully applied in the revision of the methodological framework carried out by Eurostat in the case of renewable energy and organic agriculture) is to make some of these products EP or RM “characteristic” products.

4.4. HOW TO GET THE RIGHT PICTURE

The EU Member States’ experience in collecting EGSS data shows that in general, producers of environmental protection goods and services have been very well covered by the data collection of most of the countries and data is judged to be of good quality. This is mostly due to the fact that the framework (e.g., concepts, definitions, accounting rules from the SERIEE, data collection procedures from the EPEA experience and the OECD/Eurostat Joint questionnaire experience, the use of CEPA) for environmental protection activities is well established.

Data on RM activities is still at an early stage of its development. This area is completely new for most of the countries compiling EGSS statistics and definitions as well as the classifications developed which, so far, are still at a testing stage. The main problems in this area lie in the separation of RM from resource use activities, the identification of relevant general government activities in the field of RM, the selection of relevant adapted and connected products, and the lack of data sources for RM activities.

The most important problem when collecting data for RM activities seems to be the fact that very few RM activities are easily identifiable and separable (in terms of data collection) from resource use activities. For instance, data on water management (i.e. the reduction of losses in water pipes) is hardly separable from water abstraction and distribution activities. It will require time to establish estimation methods as well as changes in the methods of data collection.

General government activities in the RM field have not been reported by most of the countries so far. This is due to the fact that no classification of General Government expenditure (i.e. the Classification of the Functions of Government, or COFOG) allows for an identification of General Government's RM activities. In order to ensure comprehensive coverage of the results, data integration (accounting) approaches are being used by countries producing EGSS statistics. In fact, most of the countries compile data based on a variety of existing sources using accounting techniques to consolidate the data and to make sure no data gaps remain. Using the same approach, Eurostat has developed a method which allows estimating the size of EGSS for the EU (Eurostat, 2014a and Eurostat, 2014b).

As highlighted by (UN ESCAP, 2013), “the potential breadth of the EGSS means that an essential first task is making a broad assessment of the structure and relative importance of the EGSS in a country. With this information in hand, a practical compilation strategy may lead to different parts of the EGSS being estimated in different ways and hence an important consideration will be understanding how different methods relate to each other such that a meaningful overall picture of EGSS can be obtained”.

5 CONCLUSIONS AND NEXT STEPS



The EGSS framework has emerged as a suitable tool to measure green activities and provide useful information (as well as a base for further analysis) of the greening of the economy. The EGSS measures how the “green” sectors develop, in terms of its revenue, value-added, employment and exports in relation to the overall economy.

In summary, the concept of EGSS, as developed by Eurostat and now included in the SEEA Central framework, attempts to answer the following questions:

- What is the scope of the “green economy”?
- Which industries produce which environmental products for which environmental domains?
- How developed is the environmental industry in a country compared to others?
- How has the “green economy” developed over time?

However, in the context of measuring green economy and its potential for growth and well-being, the following challenges are still to be clarified:

- What are the implications of a “green economy” for the whole economy?
- How can EGSS data be interpreted by policy-makers?
- What activities should be covered?
- How to measure “cleaner” and “more resource efficient” products?
- How to get the right picture?

Countries are gaining experience in producing EGSS statistics. The production and publication of data have been increasing. As a result, the EGSS statistics have been recognized at the international level and are now included in the SEEA 2012. Countries other than EU Members are testing the data collection according to the EGSS guidelines as set out in the SEEA.

Currently, most of the EGSS statistics produced in countries which have undertaken EGSS investigations are based on the analysis of existing data and the estimation of shares within industry classes. Some countries complete this source with investigations of other sources, based for example on price multiplied by quantity methods. Few countries rely on the collection of additional information through targeted surveys. EU countries are using more and more accounting approaches, which give excellent results in terms of coherence of data and affordability of compilation.

Since the measurement approaches are still different across countries, the potential for international comparison may be limited at this stage. Nevertheless, in Europe, there is growing interest in moving towards a rationalisation and streamlining of the existing methodological framework in order to be able to propose to countries efficient solutions for the production of quality data. All these processes should be tracked in order to establish an EGSS knowledge base accessible to newcomers. Furthermore, as evident from the experience of European countries, training can help in understanding the main EGSS concepts and data collection strategies and is fundamental in obtaining a coherent data collection across countries.

This streamlining process has to take into account user needs. The main policy uses relate to broad measures of economic activity and employment in EGSS and how they evolve. For certain policies, there is interest in specific activities or environmental domains (i.e. certain CEPA or CReMA classes). Analysis of policy uses and user demands is needed to refine the boundaries of the EGSS and define appropriate strategies for determining data collection priorities, as collecting detailed data for the whole EGSS is indeed very expensive in terms of resources. At the same time, the streamlining should take into account the existing data sources. Consistency of the EGSS statistics with

the ESA is being tested, as the EGSS statistics can be produced with national accounts as a starting point. Consistency with national accounting concepts would also imply the possibility of enlarging the scope of EGSS statistics and obtaining a more in-depth analysis of the path towards the greening of the economy. As the production of EGSS statistics increases, analysts will be faced with the challenge of using them for providing estimates of the importance of green economy, such as by estimating the multiplier, i.e. a factor measuring how much green economy growth will impact the whole economy.

Newcomers in the EGSS field and, in particular, developing countries need to find ways to fix the scope of EGSS measurement using a variety of means and various data sources. Although this approach is unlikely to provide data that are a perfect fit for the concepts outlined in the SEEA, it should provide sufficiently robust information for the analysis of trends in the production of environmental goods and services and the general significance of this activity in the economy.

This approach could be organised as a stepwise process with the aim of obtaining good coverage of the EGSS in stages. Depending on user demand and the availability of data, the coverage of the EGSS could be restricted to some sub-areas (some environmental domains, some products and some producers) which could be implemented one at a time.

A simplification of classification for certain activities (for example, some resource management activities) would also provide useful for newcomers as well as standard simplified reporting tables.

All these actions would help increase the quality of the EGSS measurement and at the same time would implement data comparability between countries in the long run.

NOTES

¹ UNEP's partners in the Green Growth Knowledge Platform

² http://ec.europa.eu/eurostat/ramon/index.cfm?TargetUrl=DSP_PUB_WELC

³ Basic prices are the prices receivable by the producers from the purchasers for a unit of a good or service minus any tax payable on that unit as a consequence of its production or sale plus any product subsidy per unit

⁴ As part of the SEEA 2012, the EGSS module is broadly compatible with the international System of National Accounts (SNA) (European Commission et al., 2008) and its European version, the European System of National and Regional Accounts (ESA2010) (Eurostat, 2013).

⁵ http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Main_Page

⁶ http://ilo.org/global/statistics-and-databases/standards-and-guidelines/guidelines-adopted-by-international-conferences-of-labour-statisticians/WCMS_230736/lang--en/index.htm

⁷ <http://www.ustr.gov/sites/default/files/EGs-Announcement-joint-statement-012414-FINAL.pdf>

⁸ http://www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC.aspx

ANNEX I. CLASSIFICATION OF RESOURCE MANAGEMENT ACTIVITIES FOLLOWING THE SEEA

- 10 Management of mineral and energy resources
- 11 Management of timber resources
- 12 Management of aquatic resources
- 13 Management of other biological resources (excl. timber and aquatic resources)
- 14 Management of water resources
- 15 Research and development activities for resource management
- 16 Other resource management activities

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