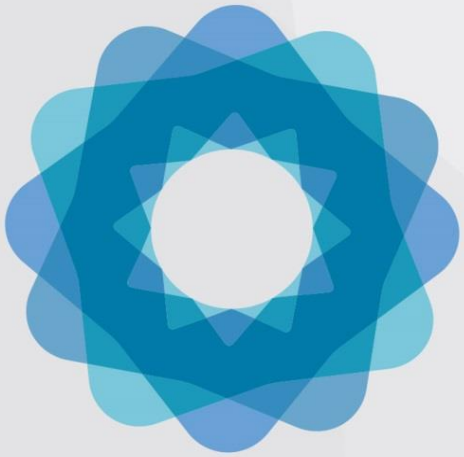

System of Environmental Economic Accounting

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SEEA Technical Note: Environmental Goods and Services Sector (EGSS)

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Contents

SEEA Technical Notes

This note is a part of a series of Technical Notes prepared to support the development of data based on the System of Environmental Economic Accounts (SEEA) Central Framework, the first international standard in environmental economic accounting. Since SEEA is not a single account but a series of modules, the accounts in each of the various modules can be developed separately in accordance with the priorities and the resource availability in each country.

The series of Technical Notes is comprised of a) a note addressing general issues that cut across domains focusing on institutional arrangements and institutional processes that encourage efficient implementation of the standard and associated data compilation exercises (see *Institutional Arrangements and Statistical Production Processes for the Implementation of the SEEA-Central Framework*) and b) a number of notes on specific modules. It is recommended that those wishing to develop data related to any of these specific modules should read the cross cutting note in conjunction with the note on the specific modules to be developed.

The notes on modules summarize the data requirements and other operational considerations designed to provide sufficient guidance to initiate the development of the accounts. The notes also provide reference information for additional publications that will support the full development of the accounts and provide information on extensions and linkages that can be exploited once the accounts and tables are in place.

I. Introduction

1. The increased awareness of the need for combating environmental pollution and preserving natural resources has led to the further development of technologies, equipment and production processes that serve environmental protection and resource management. The production of goods and services that directly serve an environmental purpose or which have been specifically designed to be used for an environmental purpose is a growing part of the overall economy and there is increasing interest in how these efforts contribute to economic activity.

2. The statistics on environmental goods and services sector (EGSS) measure the supply of environmental goods and services. The data show which economic activities are providing the means to respond to the challenges of environmental degradation and the depletion of natural resources. EGSS statistics provide indicators of the national production of environmental goods and services; the contribution of this production within the economy as a whole; and the extent of related employment and exports from the sector.

3. This technical note provides an overview of EGSS statistics according to the System of Environmental Economic Accounting 2012 Central Framework (SEEA CF) which was adopted by the United Nations Statistical Commission in 2012 as the international statistical standard for environmental-economic accounts.

4. The general purpose of SEEA Technical Notes is to summarize the key features of accounting for a given topic to support countries in the implementation of the SEEA, and describe what might be a minimum set of information to guide initial efforts in compilation. This technical note will describe the main features of the environmental goods and services sector as presented in the SEEA Central Framework.

5. EGSS statistics also provide an information source for assessing (*a*) the potential for economic activity and employment to be based on environmentally friendly and more resource-efficient activities; and (*b*) the extent to which the economy is responding to various public policies and initiatives that have this objective in mind. Defining these statistics in an internationally comparable way also permits cross-country comparison and assessment of best practices. EGSS statistics may also provide valuable source data for the Environmental Protection Expenditure Accounts[1] (EPEA) and resource management expenditure accounts (ReMEA).

6. In principle, there is a wide range of economic variables that might be considered within an EGSS context but, owing to the complexity of measurement in this area, focus is on key variables that give an indication of the relative economic size and contribution of the EGSS. Thus, the main variables included are output, value added, employment, and exports. The EGSS statistics come directly from the national accounts and associated data

[1] The Environmental Protection Expenditure Account, also part of SEEA CF, approaches this topic from a different perspective, see Table 2 for a comparison.

sets such as employment, with minimal adjustment. There are no SEEA defined accounts specifically associated with these data.

7. This technical note presents a combined presentation (see section III). This combined presentation provides countries with a template to present and disseminate an aggregated set of information relevant to the module at hand. The information included in the combined presentations are data items which are of key relevance to policy makers and which, often in combination, are used to calculate particularly important indicators (including the Sustainable Development Goal (SDG) indicators). The level of detail and industry disaggregation of the core accounts is relatively uniform across the set of module-specific technical notes. For the modules where industry disaggregation is relevant, five broad industry classes are identified.

8. The UN Statistical Commission at its 44th session in February 2013 requested that standard presentation formats be prepared such as the combined presentation for EGSS, along with other accounts such as those for energy, land, and others. These standard formats will constitutes the starting point in the development of common reporting tables in close coordination with international agencies. They will be submitted to the UNCEEA after extensive consultations with experts, including the London Group on Environmental Accounting, international organizations and national statistical offices.

9. Section II has a brief discussion of the definition of EGSS. Section III presents a summary table for EGSS which contains variables useful for the derivation of basic indicators. Section IV deals with the data sets required to produce EGSS data including the main concepts, data sources and compilation methods. Section V describes how the EGSS data may be extended to address broader issues and may be linked to other data sets. Section VI provides references and links to supporting material.

II. SEEA CF Environmental Goods and Services Sector (EGSS)

10. The EGSS consists of economic activities that produce environmental goods and services. Thus, all products (goods and services) that are produced, designed and manufactured for environmental protection and resource management purposes are within scope of the EGSS.

11. Conceptually, these activities are grouped into two broad types of environmental activity:

    Environmental protection activities are those activities whose primary purpose is the prevention, reduction and elimination of pollution and other forms of degradation of the environment.

    Resource management activities are those activities whose primary purpose is preserving and maintaining the stock of natural resources and hence safeguarding against depletion.

12. Whereas many SEEA accounts result in the integration of physical data on the environment with economic information, the EGSS calls for the decomposition of

existing national accounts information[2] to focus on the supply side of environmental related activities (see Table 1 for the Classification of Environmental Activities). This is distinct from the demand or use side which is the perspective taken by the EPEA. The data in other SEEA accounts, including those in physical terms, may be useful in estimating the required decompositions.

Table 1: Classification of Environmental Activities: overview of groups and classes

Group	Classes
I: Environmental Protection (EP)	1 Protection of ambient air and climate
	2 Wastewater management
	3 Waste management
	4 Protection and remediation of soil, groundwater and surface water
	5 Noise and vibration abatement (excluding workplace protection)
	6 Protection of biodiversity and landscapes
	7 Protection against radiation (excluding external safety)
	8 Research and development for environmental protection
	9 Other environmental protection activities
II: Resource Management (RM)	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

13. The scope of environmental activities encompasses those economic activities whose primary purpose is to reduce or eliminate pressures on the environment or to safeguard against the depletion of natural resources. Production activities are deemed to be environmental activities only if the primary purpose of the activity is consistent with the definitions of the two types of environmental activity listed as environmental, i.e., environmental protection and resource management. In practice, the primary purpose must be attributed to particular transactions or groups of transactions as recorded in the accounts. Examples of these activities are restoring polluted environments, conservation and resource management, and investing in technologies designed to prevent or reduce pollution.

II.1 Types of Environmental Goods and Services

14. The SEEA divides environmental goods and services into four types: environmental specific services; environmental sole-purpose products; adapted goods; and environmental technologies. Each of these is described in turn below.

Environmental specific services

15. Environmental specific services comprise environmental protection and resource management products that are "characteristic" or typical of those activities. Environmental specific services are environmental protection and resource management

[2] With adjustments as necessary such as for intra-firm transactions where the national accounts does not recognize any economic transaction associated with flows of environmental goods and services.

specific services produced by economic units for sale or own use. Examples of environmental specific services are waste and wastewater management and treatment services (environmental protection), and energy and water-saving activities (resource management).

Environmental sole-purpose products

16. The second type of environmental goods and services are environmental sole-purpose products. Environmental sole-purpose products are goods (durable or non-durable) or services whose use directly serves an environmental protection or resource management purpose and that have no use except for environmental protection or resource management. Examples of these products include catalytic converters, septic tanks (including maintenance services), and the installation of renewable energy production technologies (e.g., installation of solar panels).

Adapted goods

17. The third type of environmental goods and services are adapted goods. Adapted goods are goods that have been specifically modified to be more "environmentally friendly" or "cleaner" and whose use is therefore beneficial for environmental protection or resource management. For the purposes of the EGSS, adapted goods are either:

    (*a*) *"Cleaner" goods*, which help to prevent pollution or environmental degradation because they are less polluting at the time of their consumption and/or scrapping, compared with equivalent "normal" goods. Equivalent normal goods are goods that provide similar utility except for the impact on the environment. Examples include mercury-free batteries and cars or buses with lower air emissions;

    (*b*) "*Resource-efficient" goods,* which help to prevent natural resource depletion because they contain fewer natural resources in the production stage (e.g., recycled paper and renewable energy, heat from heat pumps and solar panels); and/or in the use stage (e.g., resource efficient appliances and water-saving devices such as tap filters).

18. Adapted goods differ from environmental specific services and sole-purpose products because, while they serve an environmental protection or resource management purpose (through being cleaner or more resource-efficient), they are a subset of environmental goods whose primary purpose is non-environmental and whose secondary purpose is environmental.

19. For example, the primary purpose for manufacturing buses is transportation. The current use of fossil fuels in busses is the "normal" state. Thus busses with adjusted engines for use of non-fossil fuels are technological adaptations which keeps the primary purpose of the busses (transport) intact, while addressing a secondary environmental purpose (reducing the use of fossil fuels and improving the CO2 balance).

Environmental technologies

20. The fourth type of goods and services are environmental technologies. Environmental technologies are technical processes, installations and equipment (goods), and methods or

knowledge (services), whose technical nature or purpose is environmental protection or resource management. Environmental technologies can be classified as either:

(*a*) *End-of-pipe (pollution treatment) technologies,* which are mainly technical installations and equipment produced for measurement, control, treatment and restoration/correction of pollution, environmental degradation, and/or resource depletion. Examples include sewage treatment plants, equipment for measuring air pollution, and facilities for the containment of high-level radioactive waste. End-of-pipe technologies generally treat pollution, environmental degradation and resource depletion after it has occurred.

(*b*) *Integrated (pollution prevention) technologies*, which are technical processes, methods or knowledge used in production processes that are less polluting and less resource-intensive than the equivalent "normal" technology used by other producers. Their use is less environmentally harmful than that of relevant alternatives. Note that some integrated technologies will include components that are included in the earlier categories of sole-purpose products and thus measures to avoid double counting will be required. Integrated technologies are designed to avoid producing pollution in the first place. Examples are facilities that allow the production of renewable energy such as wind and hydroelectric turbines, solar panels, and dry ovens in the cement industry.

21. Excluded from the scope of environmental goods and services are goods and services produced for purposes that, while beneficial to the environment, primarily satisfy technical, human and economic needs or that are requirements for health and safety. Goods and services related to minimizing the impact of natural hazards (e.g. for purpose of climate change mitigation or adaptation like building flood protection systems) and those related to the extraction and mobilization of natural resources are also excluded.

II.2 Relationship between EPEA and EGSS

22. The expenditures on many of the products supplied by the EGSS are also recorded in the EPEA (see comparison in Table 2). The EPEA can be an important data source for the EGSS (and vice versa) and, in principle, the two systems can be fully reconciled. A reconciliation would need to take into account, for example, that the EPEA includes all of the gross fixed capital formation from specialized producers of environmental protection goods and services (including general capital expenditures on cars, buildings etc.) to undertake environmental protection characteristic activities. Evidently, not all of the products used for this gross fixed capital formation can be identified as being specifically manufactured for environmental purposes in the EGSS. Hence, the EGSS output of capital goods designed for environmental protection will differ from the total gross fixed capital formation recorded in the EPEA. In practice, a full reconciliation is a complex operation that is rarely achieved.

Table 2: Relationship between the EPEA and the EGSS

Environmental Protection Expenditure Account vs. Environmental Goods and Services Sector		
Area of difference	EPEA	EGSS
Accounting structure	Full functional account	Table of production related statistics
Coverage of environmental activities	Environmental protection characteristic activities	Production of goods services used for environmental protection and resource management
Coverage of goods and services	All environmental protection goods and services and expenditure on other goods and services for environmental protection purposes	All environmental protection and resource management goods and services
Coverage of environmental producers	Producers only included in relation to environmental protection specific services	Producers included in relation to all environmental goods and services
Valuation of adapted goods	Net / extra cost only	Full value (at basic prices)
Coverage relating to international trade	Imports included in aggregate measures of expenditure	Exports included in aggregate measures of production
Treatment of taxes and subsidies	Valuation of expenditure at purchasers' prices	Valuation of output at basic prices

23. The EGSS takes a supply of products perspective for the production of all environmental goods and services. With this perspective, specialist producers are broadly defined to include those producers whose primary activity is the production of environmental goods and services, including specific services, sole-purpose products, adapted goods and environmental technologies. This scope is broader than the scope of specialist producers in the EPEA which is limited to producers whose primary activity is the production of environmental protection specific services and thus excluding the producers of sole-purpose products, adapted goods and environmental technologies.

24. EPEA takes the demand or expenditure perspective, but for the production of environmental protection specific services it also provides measures of both supply and use. By providing this and other details of the accounts, the EPEA provide a more complete functional account as compared to the EGSS which only provide summary information of key production related statistics i.e. output, exports, value added and employment.

25. In practice, the measurement of environmental sole-purpose products and adapted goods relies on the development of lists of relevant goods and services[3]. For sole-purpose products, the purpose of goods or services is predominantly determined based on the technical nature of the product and its technical suitability for use in environmental protection or resource management. In certain boundary cases, where the technical nature of the product does not provide a definitive guide, consideration may be given to the intent of the producer of the product. For adapted goods, the lists are formed without reference to the primary purpose of the good but are formed based on an assessment of whether, by virtue of its technical nature, the good is environmentally friendly or cleaner[4].

26. Because of the production focus of EGSS statistics, structuring information by type of economic activity following International Standard Industrial Classification (ISIC) will be important.

III. Aggregates / Indicators for EGSS

27. The top portion of Table 3 below presents estimates for the main EGSS variables: output, exports, value added and employment broken down by four important ISIC sections plus a residual grouping. Each main variable is further broken down between environmental protection and resource management activities, with 'of which' categories recommended for the output and employment variables (Table 3). Further detail could be added for types of environmental protection or resource management activity as listed in table 1. The second part of the table presents economy wide estimates for comparison and indicators preparation.

28. Initial efforts could either focus on those environmental protection or resource management activities and industries that are most important for the country and its policy needs, or where the information is most readily available. Also, initial efforts in developing these tables should focus on the production of specific services, sole purpose products and end-of-pipe technologies as these are likely to constitute the largest part of production. The values for adapted products and integrated technologies are often less important and/or often more challenging to measure.

29. The development of time series for these data provides the primary indicators as policy makers are interested in the growth of this sector relative to overall economic activity and environmental and resource management policies.

[3] For example, see Eurostat Guides and questionnaire at http://ec.europa.eu/eurostat/web/environment/methodology
[4] The challenges of distinguishing adapted goods is further discussed in paragraphs 4.74 – 4.78 of SEEA CF.

Table 3: Environmental goods and services sector (currency units)

	Industries (by ISIC)					TOTAL
	Agriculture Forestry & Fishery (ISIC A)	Mining & Quarrying (ISIC B)	Manufacturing (ISIC C)	Electricity, gas, steam & air condition-ing supply (ISIC D)	Other Industries	
1. Output of environmental goods and services:						
Environment protection	760	1810	5140	5265	4175	17150
of which: waste management	512	1219	3462	3546	2811	11550
Resource management	722	910	4163	5830	3875	15500
of which: renewable energy	38	56	150	507	222	973
TOTAL	1482	2720	9303	11105	8040	32650
2. Gross value added of environmental goods and services:						
Environmental protection	291	580	2172	2262	1610	6915
Resource management	386	710	1896	2513	1780	7285
TOTAL	677	1290	4068	4775	3390	14200
3. Exports of environmental goods and services:						
Environmental protection	43	115	567	335	312	1372
Resource management	82	125	318	195	408	1128
TOTAL	125	240	885	530	720	2500
4. Employment from environmental goods and services ('000 people):						
Environmental protection	14	34	104	108	77	337
of which: waste management	6	15	46	48	35	150
Resource management	16	23	73	105	76	293
of which: renewable energy	1	1	2	4	3	11
TOTAL	30	57	177	213	153	630
5. Output	170737	116473	1581433	195769	5059131	7123543
6. GDP	8659	10526	5546	21407	773753	819891
7 Exports	1559	3179	6034	8392	164984	184148
8. Employment	145	148	78	165	10295	10831

30. The EGSS table provides the basis for indicators showing how the variables for the EGGS are evolving relative to the corresponding measures for the total economy. These indicators provide information broken down by industry and potentially environmental activity.

VI. Compilation

31. The compilation of SEEA accounts should be founded on the Generic Statistical Business Process Model (GSBPM) as outlined in the first note in this series "Statistical Production Processes for Implementation of the SEEA-Central Framework".

Overarching Management Functions							
1 Specify Needs	2 Design	3 Build	4 Collect	5 Process	6 Analyze	7 Disseminate	8 Evaluate

VI.1 Specify Needs, Design & Build

32. It is often the case when building accounts (SEEA or SNA for example) that one of the goals is to use existing data sources as much as possible. In such a case, the Specify Needs, Design and Build phases will often need to be undertaken simultaneously and iteratively, as one evaluates the capacity of existing data sets to meet needs relative to the potential costs of initiating new data development.

33. These initial steps may not need to be undertaken for each data cycle but should be revisited periodically in conjunction with longer term planning cycles.

Establish needs and potential data sources

34. Following the definition above, identify the sector in terms of producers (i.e. enterprises/establishments) based on their activities and products. Decide the level of disaggregation (e.g. industry, type of product, i.e. sole-purpose, adapted etc., resource type) and consider which other data could be linked (e.g. economic statistics, social statistics, population).

35. Consult with policy makers, stakeholders and potential data providers on the environmental and resource management activities of interest for the country. Consider links to other environmental data initiatives planned or underway that could be potential data sources or provide guidance in classifying or identifying environmental goods and services (EPEA for example). Once specific activities to be covered are identified, this will provide a basis to examine the adequacy of the existing data and assess where additional information may be required.

36. It will be important to find the appropriate balance between the detail sought by policy makers and analysts and the capacity of the statistical infrastructure to deliver sufficiently robust estimates particular in the early stages of development. However it is also important to recognize the demands for detailed estimates so that the development of data sources and systems can anticipate eventual improvements in these dimensions.

37. When first setting up an EGSS account, care should be taken to not be overly ambitious. Finding or collecting data for non-specialized producers with only small production values may prove very costly. It is advisable to focus on major producers and products in the initial development and then improve the estimates as experience with the account is acquired.

38. Some activities and products such as operation of the waste water treatment system or waste management and associate services (ISIC 37-39) will be totally within scope for EGSS. However, in many other cases of the production of environmental goods and services will only form part of the activities of some producers and lists of products or activities within broader groups may have to be established. The development of such a list should take into account the size of such activities in the economy with priority being given to activities with sufficient importance. Table 2 below provides an example of activities that the Netherlands has used in estimating EGSS[5]. All of the production in establishments classified to these activities is included in the EGSS.

39. For some activities, for example production of industrial environmental equipment, only part of the production of an establishment may be related to that activity. In that case, detailed information on that establishment is needed to determine the share of the production related to the environmental goods and services to measure output, exports, value added and employment.

Table 2 EGSS Activities used in the Netherlands

Activity	Main source
Sewage and refuse disposal services	National accounts, supply and use tables
Wholesale in waste and scrap	National accounts, supply and use tables
Environmental related inspection and control	Employment registers
Government governance related to the environment	Environmental Statistics, EPE statistics
Organisations and associations on the environment	Employment registers and business register
Internal environmental activities at companies	Environmental Statistics, EPE statistics
Renewable energy production	Energy Statistics, Renewable energy statistics
Energy saving and sustainable energy systems	Own constructed database and Production Statistics
Insulation activities	National accounts
Organic agriculture	Agriculture statistics, area of organic agriculture
Recycling	National accounts, supply and use tables
Second hand shops	Production Statistics
Water quantity control by waterboards	National accounts, Government accounts
Environmental advice, engineering and other services[1]	Own constructed database and Production Statistics
Industrial environmental equipment[1]	Own constructed database and Production Statistics
Environmental technical construction[1]	Own constructed database and Production Statistics
Environmental related education	Education statistics

40. More generally, since EGSS takes the supply side approach, identifying units on the business register that are active producing environmental goods and services should be

[5] See the following link for further information on the Netherlands example:
http://www.cbs.nl/NR/rdonlyres/6048B589-C79F-416E-A5E2-BD93E3DCA29C/0/2012EGSSCBSbackground.pdf
see also the following list compiled by Eurostat
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2015.307.01.0017.01.ENG

considered. Data collection processes that allow the identification of secondary activities can provide the basis for more targeted surveying beyond principal activity. Canada, for example, provides the capacity to record program specific attributes that are linked to entities on the business register for targeted data collection activities.

41. Business associations may be a source of producers of EGSS. Contacting the association may provide access to lists of members or the association may be prepared to use its own expert knowledge of sector activities to identify major producers and products relevant for the nation. They also often have knowledge of patterns of international trade and possibly which activities or products are not significant for the particular economy.

42. Identification at the establishment or enterprise level may also allow the use of micro data linking techniques. This may allow the linking of data across survey and administrative data sets to provide new detailed data categories.

43. Identify potential data sources and assess their suitability for estimating the desired variables for each of the EGSS activities that have been identified. It is important to thoroughly assess the metadata for the available datasets. First, assess whether or not the definitions conform to and/or support those set out for the required activities in the design stage. If not, is the shortcoming important or can it be overcome with estimates based on alternate sources? Also, key at this stage is to clearly ascertain the classification, conceptual and coverage differences across the various data sets to be used as basic inputs.

44. Assess if there are readily available concordances between the classification systems and if there are reliable sources that can be used to estimate adjustments for conceptual and coverage difference. Complete concordances generally do not exist for the types of activities covered by EGSS.

45. If one needs to go beyond existing data sources, in particular to split out detailed activities there are few options available to obtain the data. One is to perform a survey[6], the other is to compile a register of enterprises and build a separate database for EGSS[7]. It is also possible to perform a combination of the two approaches. The approach to estimating these variables is generally from the supply side but the costs of broad supply side surveys means that there are only a few countries with such surveys on a regular basis.

46. Many of the efforts to estimate EGSS have been based on using proxies from other data sources to estimate ratios that are applied to national accounts information. For example, in the Netherlands it is known that 17% of all paper products that are produced were identified as being environmental. This information is used to provide an estimate of the number of full-time, part-time employees and/or person hours dedicated to environmental purposes in the paper industry, which in turn are used to estimate output, value added,

[6] Canada and Germany are two examples that conduct surveys

[7] Netherlands and Sweden are two examples that compile a register

etc. Increasingly industry associations are highlighting members activities related to environmental activities and these reports may provide the basis of such ratios.

47. Environmental data sets used for other SEEA accounts may provide information on production of environmental goods and services. Also, economic data programs may provide some data of use for the identification of these activities.

Secure basic data

48. At this point, if sufficient basic data is not available to produce estimates for one or more important environmental goods and services, it may be necessary to initiate a project to establish a new source of data. This may mean that the development of the sector splits into two paths: one that can provide partial coverage with existing data and one where development would have to await the availability of basic data.

49. In some cases where partial data exist but there are some important data gaps, it may be a good idea to construct a preliminary set of estimates based on related flows or modelling to fill the gaps. This could be done to aid in the development of the missing basic data.

50. In the case where basic data must be developed, it is recommended that a separate project be initiated to develop the necessary data. This project should follow the GSBPM steps and generic principles as set out in the first note in this Technical Note series. Depending on the organization of responsibilities within the statistical infrastructure of the country, this step may involve additional agencies or sectors of the NSI.

51. Secure access to data, associated metadata and the rights to disseminate the estimated variables that are derived from that data. Where needed, obtain access to expertise in organizations from which data is being sought to assist with analysis and/or training.

52. SEEA compilers will at an early stage need to ensure access to these data if sharing agreements do not already exist. The terms of access under current institutional arrangements are key. The terms should support cooperative working arrangements and the release of data with sufficient detail to address the policy issues important for the country.

53. This step can take considerable effort and time in cases where institutional arrangements are not yet established. It will be important for all agencies involved to clearly appreciate the mandate of the other agencies and associated constraints.

54. It is important to make other compilers, both those responsible for other environmental data and economic compilers such as those for the national accounts, aware of the data requirements for these types of activity accounts and to encourage them to enhance their datasets and systems to support the ongoing production of EGSS data.

55. Establishing and maintaining good working relations with the agencies that are the source for basic data can pay dividends later in the production process when estimation challenges require expertise to overcome. This is particularly important for EGSS data

sets due to the challenges in splitting out secondary environmental activates from standard based data sets.

Build databases and estimation procedures

56. Set out a plan for the progressive implementation of EGSS based on the availability of resources and basic data. The databases to house the EGSS data and procedures to translate basic data to EGSS concepts must be built using corporate systems and methodology resources when possible.

57. Databases for the basic data and the associated accounts must be established. Given the SEEA links to the SNA, existing database structures and associated processing systems may be a good source for this development. Some adjustments will be required to add components not in the SNA such as intra-enterprise flows.

58. Use of the same systems and processes will facilitate aligning of data sets and should help reduce the development costs for the new accounts and facilitate the integration of data for the production of indicators. At a minimum systems should be aligned such that datasets from various system can be easily integrated.

VI.2 Collect

59. Import data and process data including applying concordances that may be required between the classifications used in the imported data and the classifications to be used for the estimates.

60. The SUT and corresponding employment information are natural foundational data sets for the limited variables produced for EGSS. Data to identify and or allocate these data to that corresponding to EGSS will also be required. Linking to micro data sets may allow more accurate allocations when this is feasible.

61. Since the majority of data for this account is from the national accounts or data sets used for the national accounts, concordances to industry will often be available. However, in the product domain, it will be necessary to construct concordances to environmental goods and services. In addition, since only a part of some product classes will comprise environmental goods and services, data to allocate these products may be necessary. For example, overall export ratios for some activities may be used to estimate the export share of environmental goods and services from those domains.

62. Given that data may be acquired from a number of institutions or agencies, it is important to establish standard data transfer protocols. Invariably agencies require changes/upgrades to systems and these may impact data integration if protocols are not in place. It is also important to collect metadata with each period or at least verify that it has not changed so as to be aware of any changes to classification, definitions, etc.

VI.3 Process

63. Prepare estimates, including the estimation of data for any data gaps. Given the use of proxies to estimate some data and the varying quality and coverage of these, it is likely that different methods will need to be considered for each industry/sector of the economy.

VI.4 Analyse

64. Analyse tables and graphic representations including undertaking an analysis of time series where possible and recognising the likely need for multiple iterations of this and the previous step. Data quality should be assessed and documented at this stage.

65. The steps in the above three paragraphs are the core activities in building the estimates and will be repeated during each production period. This allows the strength of the accounting approach to be used to confront the various data sources and check for consistency in comparison to other datasets such as the related national accounts values.

66. The first time accounts are estimated for a new program, particular attention needs to be made with regard to adjustments required to the source data to ensure the methods used are appropriate and sound. Given that proxy data and ratios are likely to be used for these estimates, the reasonableness of the initial estimates needs to be thoroughly assessed.

67. It is recommended that in cases where significant basic data come from other agencies, the staff of those agencies be asked to participate in the analysis of the estimates. These experts often have in depth knowledge that can allow the identification and resolution of inconsistencies.

VI.5 Disseminate

68. Disseminate estimates, including material to assist interpretation (e.g. indicators, methodological notes and statements of data quality.)

69. The dissemination of data should always be accompanied by sufficient documentation and metadata to allow users to fully understand the information being disseminated. This is particularly important for the initial dissemination of a new program of data where one might want to identify the initial data as ‘experimental’ or ‘preliminary’ and make it clear that user input is being sought in order to improve future releases.

VI.6 Evaluate

70. Archive data and related methodological and other documentation. Review estimates, data sources, methods and systems, including actively seeking user feedback.

71. These last two steps are very important for all statistical programs but when initiating a new program of data, seeking user feedback is crucial. This in turn depends on the

existence of good documentation on the methods and systems so as to properly inform users and assess their feedback.

V. Extensions and links

72. The EGSS table in Section III focuses on four key variables but others may be added to expose other dimensions of this sector. Exports may be of interest as producers find opportunities to grow through the provision of broader markets. Given the detailed nature of trade data, if exports are significant, this may be a good source to enhance the overall quality of the estimates for some products/industries.

73. The extent to which production is being used to enhance the capital stock in support of environmental purposes may provide information on the sustainability of current efforts.

74. Information on specific products or industries may also be of interest depending on the situation in the country. Such detail will depend on the source data available or on efforts to collect additional data, should this be warranted.

75. Finally, it should be noted that with the heightened interest in environmental and sustainable development issues, there is considerable technological progress in product development for this domain. It will be important to update product and services lists on a regular basis. Again, maintaining strong working relationships with other agencies can be useful in this regard.

VI. References

Eurostat EGSS Manual, 2007 http://ec.europa.eu/eurostat/documents/3859598/5910217/KS-RA-09-012-EN.PDF/01d1733e-46b6-4da8-92e6-766a65d7fd60?version=1.0

National Institute of Romania (2014) Environmental accounts: Environmental protection expenditure accounts (EPEA), Air emissions accounts (AEA), Environment industry accounts (EGSS)

Statistics Norway (2013) Environmental goods and services sector (EGSS)

See examples from Eurostat studies at:
http://ec.europa.eu/eurostat/web/environment/environmental-goods-and-services-sector

http://ec.europa.eu/eurostat/documents/1798247/6079569/Catalogue-of-pilot-study-reports-09-12-2014.xls

Examples of dissemination of statistics, country level:

UK environmental goods and services sector (EGSS): 2010-2012

http://www.ons.gov.uk/ons/dcp171778_401418.pdf

Turnover in environmental sector increases in Sweden

http://www.scb.se/en_/Finding-statistics/Statistics-by-subject-area/Environment/Environmental-accounts-and-sustainable-development/System-of-Environmental-and-Economic-Accounts/Aktuell-Pong/38171/Behallare-for-Press/379413/

https://www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/Umwelt/UmweltstatistischeErhebungen/Umweltoekonomie/Tabellen/TabellenWarenDienstleistungen.html

Contacts at national level:

UK's mailbox for questions and further contacts: Environment.Accounts@ons.gsi.gov.uk

Sweden's mailbox for questions and further contacts: miljorakenskaperna@scb.se

There are a few examples available for practical implementation listed below:

Eurostat: http://ec.europa.eu/eurostat/web/environment/overview

Statistics Sweden: http://www.scb.se/Statistik/MI/MI1301/_dokument/MI1301_BS_2003-2013_Miljosektorn_150119.pdf (in Swedish)

Statistics Spain:
http://www.ine.es/jaxi/menu.do?type=pcaxis&path=%2Ft26%2Fp067&file=inebase&L=0 (in Spanish)

SEEA-Central Framework (UNECE 2013 edition):
http://unstats.un.org/unsd/envaccounting/White_cover.pdf

SNA 2008: System of National Accounts
https://unstats.un.org/unsd/nationalaccount/sna2008.asp

Annex 1: Classification of Environmental Activities (CEA)

I. Environmental protection

Environmental protection activities are those activities whose primary purpose is the prevention, reduction and elimination of pollution as well as any other degradation of the environment. This includes measures taken in order to restore the environment after it has been degraded due to the pressures from human activities. To be included under environmental protection, actions and activities must satisfy the primary-purpose criterion, i.e., that environmental protection is their primary objective. Actions and activities that have a favourable impact on the environment but which serve other goals do not come under environmental protection. Hence, excluded from the field of environmental protection are activities that, while beneficial to the environment, primarily satisfy technical needs or the internal requirements for hygiene or security of an enterprise or other institution.

Activities like the saving of energy or raw materials are generally excluded from environmental protection and included instead under resource management (see below). However, such activities are considered environmental protection activities to the extent that they mainly aim at environmental protection.

1 Protection of ambient air and climate

Protection of ambient air and climate comprises measures and activities aimed at the reduction of emissions into the ambient air or ambient concentrations of air pollutants as well as measures and activities aimed at the control of emissions of greenhouse gases and gases that adversely affect the stratospheric ozone layer.

Excluded are measures undertaken for cost-saving reasons (e.g., energy saving).

2 Wastewater management

Wastewater management comprises activities and measures aimed at the prevention of pollution of surface water through the reduction of the release of wastewater into inland surface water and seawater. It includes the collection and treatment of wastewater, including monitoring and regulation activities. Septic tanks are also included.

Excluded are actions and activities aimed at the protection of groundwater from pollutant infiltration and the cleaning up of water bodies after pollution (see CEPA 4).

Wastewater is defined as water that is of no further immediate value for the purpose for which it was used or in the pursuit of which it was produced, because of quality, quantity or time of its occurrence.

3 Waste management

Waste management refers to activities and measures aimed at the prevention of the generation of waste and the reduction of its harmful effect on the environment. Includes the collection and

treatment of waste, including monitoring and regulation activities. It also includes recycling and composting, the collection and treatment of low-level radioactive waste, street cleaning and the collection of public litter.

Waste are materials that are not prime products (that is, products made for the market) for which the generator has no further use for own purposes of production, transformation or consumption, and which he wants to dispose of. Wastes may be generated during the extraction of raw materials, during the processing of raw materials to intermediate and final products, during the consumption of final products, and during any other human activity.

Residuals recycled or reused at the place of generation are excluded. Also excluded are waste materials that are directly discharged into ambient water or air.

Hazardous waste is waste that owing to its toxic, infectious, radioactive, flammable or other character defined by the legislator, poses a substantial actual or potential hazard to human health or living organisms. For the purposes of this definition, "hazardous waste" comprises for each country all those materials and products that are considered to be hazardous in accordance with that country's practices. Low-level radioactive waste is included, whereas other radioactive waste is excluded (see CEPA 7).

Low-level radioactive waste is waste that, because of its low radionuclide content, does not require shielding during normal handling and transportation.

Treatment of waste refers to any process designed to change the physical, chemical or biological character or composition of any waste in order to neutralize it, render it non‑hazardous, safer for transport, amenable for recovery or storage, or to reduce it in volume. A particular waste may undergo more than one treatment process. Composting and recycling activities for the purpose of environmental protection are included. Often *composting* is a waste treatment method and the resulting compost provided free of charge or at a very low price. The manufacture of compost classified in division 24 of the International Standard Industrial Classification of All Economic Activities (ISIC)/Statistical Classification of Economic Activities in the European Community (NACE) (Manufacture of fertilizers and nitrogen compounds) is excluded.

Division 37 of ISIC/NACE defines *recycling* as the processing of waste, scraps whether or not used, into a form feasible to be transformed in new raw materials. Typical is that, in terms of commodities, both input and output consist of waste and scrap, the input being sorted or unsorted but always unfit for further direct use in an industrial process whereas the output is made fit for further processing and is to be considered then as an intermediate good. A process is required, either mechanical or chemical. The main purpose of activities classified in division 37 of ISIC/NACE is the manufacture of secondary raw materials but there may be important secondary waste management activities.

Compost and secondary raw materials (as well as products made of secondary raw materials) are not considered environmental protection products. Their use is excluded.

Disposal of waste is the final deposition of waste on the ground or underground in controlled or uncontrolled fashion, in accordance with the sanitary, environmental or security requirements.

4 Protection and remediation of soil, groundwater and surface water

Protection and remediation of soil, groundwater and surface water refers to measures and activities aimed at the prevention of pollutant infiltration, cleaning up of soils and water bodies and the protection of soil from erosion and other physical degradation as well as from salinization. Monitoring and control of soil and groundwater pollution are included.

Excluded are wastewater management activities (see CEPA 2), as well as activities aimed at the protection of biodiversity and landscape (see CEPA 6).

5 Noise and vibration abatement (excluding workplace protection)

Noise and vibration abatement refers to measures and activities aimed at the control, reduction and abatement of industrial and transport noise and vibration. Activities for the abatement of neighbourhood noise (soundproofing of dancing halls, etc.) as well as activities for the abatement of noise in places frequented by the public (swimming pools, etc.), in schools, etc., are included.

Excluded is the abatement of noise and vibration for purposes of protection at the workplace.

6 Protection of biodiversity and landscapes

Protection of biodiversity and landscape refers to measures and activities aimed at the protection and rehabilitation of fauna and flora species, ecosystems and habitats as well as the protection and rehabilitation of natural and semi-natural landscapes. Separating "biodiversity" from "landscape" protection may not always be practical. For example, maintaining or establishing certain landscape types, biotopes and ecozones and related issues (hedgerows, lines of trees to re-establish "natural corridors") have a clear link to biodiversity preservation.

Excluded is the protection and rehabilitation of historic monuments or predominantly built-up landscapes and the control of weed for agricultural purposes, as well as the protection of forests against forests fire when this responds predominantly to economic concerns. The establishment and maintenance of green spaces along roads and recreational structures (e.g., separating golf courses and other sports facilities) are also excluded.

Actions and expenditure related to urban parks and gardens would not normally be included but may in some cases be related to biodiversity: in such cases, the activities and expenditure should be included.

7 Protection against radiation (excluding external safety)

Protection against radiation refers to activities and measures aimed at the reduction or elimination of the negative consequences of radiation emitted from any source. Included is the handling, transportation and treatment of high-level radioactive waste, i.e., waste that, because of its high radionuclide content, requires shielding during normal handling and transportation.

Excluded are activities and measures related to the prevention of technological hazards (e.g., external safety of nuclear power plants), as well as protection measures taken at workplaces.

Also excluded are activities related to collection and treatment of low-level radioactive waste (see CEPA 3).

Definition of radioactive waste

Any material that contains or is contaminated with radionuclides at concentrations or radioactivity levels greater than the "exempt quantities" established by the competent authorities, and for which no use is foreseen. Radioactive wastes are produced at nuclear power plants and at associated nuclear fuel cycle facilities as well as through other uses of radioactive material, for example, the use of radionuclides in hospitals and research establishments. Other important wastes are those from mining and milling of uranium and from the reprocessing of spent fuel.

8 Research and development for environmental protection

Research and development (R&D) comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge and the use of this knowledge to devise new applications (see the Frascati Manual (OECD, 2002) in the field of environmental protection. The class regroups all R&D activities and expenditure oriented towards environmental protection: identification and analysis of sources of pollution and mechanisms of dispersion of pollutants in the environment, as well as their effects on human beings, the species and the biosphere. This heading covers R&D for the prevention and elimination of all forms of pollution, as well as R&D oriented towards equipment and instruments of pollution measurement and analysis. When separable, all R&D activities, even when referring to a specific class, have to be classified under this position. Environmental R&D is further classified in accordance with the 1993 Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets (NABS) (Eurostat, 1994).

Excluded are R&D activities related to the management of natural resources.

9 Other environmental protection activities

Other environmental protection activities refers to all environmental protection activities that take the form of general environmental administration and management activities or training or teaching activities specifically oriented towards environmental protection that encompass public information, when they are not classified elsewhere in CEPA. It also includes activities leading to indivisible expenditure, as well as activities not elsewhere classified.

II. Resource management (RM) (interim)

Resource management includes all actions and activities that are aimed at preserving and maintaining the stock of natural resources and hence safeguarding against depletion. This includes actions and activities aimed at reducing the withdrawals of natural resources (recovery, reuse, recycling, substitution of natural resources) as well as restoring natural resource stocks (increases/recharges of natural resource stocks).

To be included under resource management, actions and activities or parts thereof must satisfy the primary-purpose criterion, i.e., that resource management is their primary objective. Those activities whose primary purpose is environmental protection are therefore excluded.

10 Management of mineral and energy resources

Includes the activities and actions aiming at minimizing the intake of mineral and energy resources through in-process modifications, the recovery, reuse, recycling, savings and use of substitute mineral resources, the production of energy from renewable sources and any other kind of measure. Activities and actions concerning measurement, control, laboratories and the like are also included, as well as education, training and information and administration and regulation activities.

11 Management of timber resources

Includes the activities and actions aiming at minimizing the intake of natural timber resources through in-process modifications as well as recovery, reuse, recycling, savings and the use of substitutes of forest products. Replenishment activities like reforestation and afforestation are included when they concern natural forests. Activities and actions concerning measurement, control, laboratories and the like are also included, as well as education, training and information and administration and regulation activities. Exploitation and exploration activities of natural timber resources are excluded.

12 Management of aquatic resources

Includes the activities and actions aiming at minimizing the intake of wild fish and other aquatic resources through in-process modifications as well as the use of alternative resources and any other kind of measure. Replenishment activities like repopulation of wild fish stocks are included when they aim at maintaining/increasing the consistency of stocks (not their biodiversity → CEA 6). Activities and actions concerning measurement, control, laboratories and the like are also included, as well as education, training and information and administration and regulation activities. The class includes all the activities and actions having the purpose of managing, maintaining and increasing the stock of aquatic resources. The protection of biodiversity of aquatic resources is excluded (→ CEA 6).

13 Management of other biological resources (excluding timber and aquatic resources)

Includes the activities and actions aiming at minimizing the intake of biological resources other than timber and aquatic resources through in-process modifications as well as the use of alternative resources and any other kind of measure. Replenishment activities like repopulation of wild flora and fauna stocks are included when aimed at maintaining/increasing the consistency of stocks (not the biodiversity → CEA 6). Activities and actions concerning measurement, control, laboratories and the like are also included, as well as education, training and information and administration and regulation activities. Other biological resources are stocks and reserves of non-cultivated animals and plants (excluding timber and aquatic resources). The class includes all the activities and actions with the purpose of managing, maintaining and increasing the stock of the resources. Activities aimed at the protection of biodiversity of wild flora and fauna are excluded (→ CEA 6).

14 Management of water resources

Includes the activities and actions aimed at minimizing the intake of water resources through in-process modifications as well as reuse, recycling, savings and the use of substitutes of freshwater resources. Activities aiming at the replenishment of water stocks are included. Activities and actions concerning measurement, control, laboratories and the like are also included, as well as education, training and information and administration and regulation activities. Exploitation, exploration and distribution activities are excluded.

15 Research and development activities for resource management

Creative work undertaken on a systematic basis in order to increase the stock of knowledge and the use of this knowledge to devise new applications in the field of natural resource management and savings.

Excluded are R&D activities related to environmental protection → CEA 8.

16 Other resource management activities