Institutional Arrangements and Statistical Production Processes for the Implementation of the SEEA-Central Framework

Draft paper prepared by UNSD

(for discussion)

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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) this 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 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 this 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 in 10-15 pages 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 effect of human activity on the environment has emerged as one of the most significant policy issues. On the one hand, there has been growing concern about the effect of each country's economic activity upon the local and global environment. On the other hand, there has been increasing recognition that continuing economic growth and human welfare are dependent upon the benefits obtained from the environment.

2.   The challenge of integrating the economic and environmental aspects to confront these complex policy challenges is like many of the challenges of the twenty first century which require information from multiple disciplines and sources. The System of National Accounts has for many decades been integrating data from different sources into a set of accounts that have become the foundation of much of economic policy formulation. The challenges faced in integrating these economic data have led to many local and international initiatives aimed at harmonizing the production of the economic, social and environmental data. Standards for economic accounts and classifications have become increasingly harmonized in recent years. More recently, the focus has shifted to common production processes that can further assist in the efficient integration of economic data sets1.

3.   The growing recognition of the interdependencies between policies aimed at maintaining economic wellbeing and environmental wellbeing, call for data systems that integrate economic and environmental information. The System of Environmental-Economic Accounts is the response to this need.

4.   The establishment of the System of Environmental and Economic Accounts 2012 as an international standard raises the integration challenges to a new level as the data sets to be integrated are no longer from a single discipline such as with the SNA where the data are from the economic domain. The integration of data from multiple disciplines requires cooperation among professions in each of these disciplines to ensure that the data sets are harmonized in such a way as to provide quality information to policy makers.

5.   The first in this series of Technical Notes for compilers tasked with the implementation of the SEEA accounts discusses some of the overarching challenges of building integrated data systems building on the lessons learned from the national accounts and other international initiatives. This note discusses selected aspects of the general institutional arrangements and production processes with guidance for compilers on specific topics elaborated in the remainder of the series of Technical Notes.

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[1] Reference "Guidelines on Integrated Economic Statistics".

6.   While SEEA-CF as the only standard in this area of statistics is the focus of this series of notes, the approach outlined in this note and the lessons it describes can be applied to other environmental accounting domains such the Experimental Ecosystem Accounts (EEA).

II. Environmental-economic accounting: what is it and why is it useful?

What is environmental-economic accounting?

7.   The environmental-economic accounting approach, as described in the SEEA, is a systems approach to the organization of environmental and economic information which covers, as completely as possible, the stocks and flows that are relevant to the analysis of environmental and economic issues. In applying this approach, the SEEA utilizes the accounting concepts, structures, rules and principles of the System of National Accounts (SNA). In practice, environmental-economic accounting includes the compilation of physical supply and use tables, functional accounts (such as environmental protection expenditure accounts) and asset accounts for environmental assets and natural resources.

8.   The SEEA Central Framework extends the scope of the SNA by:

  i.   Providing standard terminology, definitions and classifications for environmental-economic information
  ii.   Including accounting for physical stocks of environmental assets (including natural resources) in addition to measures of their monetary value
  iii.   Integrating physical measures of flows of natural inputs (e.g. timber, fish, minerals, energy, water) and residuals (e.g. air emissions, emissions to water, solid waste) with flows of products (e.g. fuel, steel, food) for integrated natural resource management, climate change policy and efficient resource use
  iv.   Linking measures of stocks and flows in physical terms to associated monetary measures and to relevant economic activities and economic units (including enterprises, households and governments) for purposes of fiscal policy (e.g. revenues and expenditures), wealth management (e.g. natural resources and related resource rents) and environmental preservation and protection
  v.   Detailing those standard economic transactions that can be considered "environmentally related", including environmental protection expenditure, environmental taxes and environmental subsidies.

9.   Environmental-economic accounting addresses the more commonly referred to analytical field of natural capital accounting. Although its scope is not usually defined specifically, natural capital accounting as an analytical application of the accounts generally includes wealth accounting for physical and monetary stocks of environmental assets (including natural resources) as described in the SEEA Central Framework and accounting for ecosystems.

10.   Often there is an assumption that environmental-economic accounting must necessarily involve the monetary valuation of natural resources and non-marketed environmental flows. However, the SEEA stresses that the use of an accounting approach for the organization of information on physical stocks and flows is legitimate and highly beneficial. Indeed, because of the nature of the assumptions required to undertake valuation, the compilation of accounts in physical terms may provide information that is both necessary and sufficient for analytical purposes.

Benefits of an accounting approach

11.   An accounting approach can bring coherence and consistency across previously disparate sets of data. Environment statistics, like statistics in other domains, are often developed to address specific issues. For example, a policy to increase the contribution of the mining sector to the economy may be monitored by statistics showing the volume and value of the minerals extracted. A "big picture" perspective on the long-term benefits and costs of this policy would include statistics on the stocks of the resource being exploited, the cost of extraction, the flows of products and income, and the residuals (of waste and emissions) created.

12.   Source data on stocks may have different statistical properties from data on their extraction. These data may have been collected using different classifications, for different periods or with incomparable units. With some effort, all these data can be brought into a single accounting framework. This can be done by adjusting the data or changing the way the data are collected. By doing so, the stocks of nonrenewable resources can be compared with the extraction of those resources so that assessments can be made of the expected lifetime and impacts.

13.   By combining estimates of resource stocks with statistics on extraction and consumption, linking consumption rates with specific industries and with their production of residuals, this:

  i)   provides a "big picture" perspective,
  ii) encourages compete coverage and identifies missing information,
  iii) links and organises a wide variety of basic data and statistics,
  iv) enables the comparison of different activities and sectors (e.g. across agriculture and tourism) and
  v)   provides statistics and accounts linked directly to the national accounts which can be used for deriving indicator and for macro-economic modelling

vi) allows for the creation of new analyses and indicators, such as:
  (a) the total monetary wealth of mineral and energy resources;
  (b) the greenhouse gas intensity of economic activities;
  (c) pollutant intensity by demand categories such as households and exports.

14.   The ability of accounting approaches to provide a "big picture" perspective is not only useful for measurement and data confrontation. Accounting frameworks can also be used effectively as part of priority setting for analytical and policy purposes since their coverage means that all relevant aspects must be integrated into the discussion, and they can also be used as a basis for the development of models and alternate scenarios. Both statistical and analytical applications have underpinned the use of accounting frameworks as a core part of commercial business practice and the development and management of economic policy for many decades. The SEEA shows that the benefits obtained in these fields through the use of accounting frameworks can also be obtained when considering the relationship between the economy and the environment.

15.   The SEEA organizes a very wide range of information about the relationship between the environment and the economy and there is no underlying or single policy to which SEEA is related. Consequently, SEEA can be used to inform multiple policy objectives by conveying a common history of past trends in the environment-economic interaction. The integrated nature of the SEEA also supports analysis of integrated policy objectives or those involving trade-offs between alternative policy options – for example, in assessing the potential linkages between climate change, water and energy policies.

16.   SEEA can provide a very detailed set of data within an integrated structure if the requisite source data are available. Such detailed data could support rigorous analytical and modeling work. At the same time, with more summary data, the same integrated structure is still used, and summary data on for example physical flows and related monetary transactions may be sufficient to provide useful indicators of trends in efficiency, productivity and decoupling (e.g. water use and energy use in mining relative to their value added). Such summary indicators and aggregates that can be derived from the SEEA may be important in the context of framing policy discussions before detailed analysis is undertaken in particular areas.

III. SEEA Accounts

17.   The primary link between the SNA and the environmental data is established by constructing physical supply-use tables for selected products that include the physical flows from the environment to the economy and from the economy to the environment. The account mirrors the SNA supply use account with the addition of the Environment as a source of natural inputs

and the ultimate destination of residuals that may flow through various parts of the economy first.

18.   Given the account parallels that of the SNA, the physical flows in SEEA mirror those in the monetary transactions in SNA with a few exceptions briefly discussed below.

SEEA asset accounts present the opening and closing stocks of natural resources expanding the balance sheet of the economy as presented in the SNA to include natural resource stocks in physical terms. For each natural resource stock this account presents the opening and closing balance for a period with the flow of the resource into the economy during the period and along with other changes in stock. When presented in monetary terms revaluation during the period is also shown.

19.   An important component of environmental-economic accounting is the recording of transactions in monetary terms between economic units that may be considered environmental. Generally, these transactions concern activity undertaken to preserve and protect the environment. Further, there are a range of transactions, such as taxes and subsidies that reflect efforts by governments, on behalf of society, to influence the behaviour of producers and consumers with respect to the environment.

20.   Most of these environmental transactions are recorded within the core national accounts framework, but many cannot be easily identified owing to the structure of the accounts or the types of classifications that are used. The general approach to identifying transactions related to a particular theme or topic is described in the SNA 2008[2] in its discussion of satellite accounts. A satellite account is formed through the adaptation and rearrangement of the core structures of the SNA to suit particular objectives. For the objective of identifying environmental transactions, the primary rearrangement is based on consideration of the principal purpose underlying each transaction and using functional classifications.

21.   The Technical Notes for the specific modules listed in the Annex provide details on the preparation of specific accounts or application of functional classifications in addressing a range of issues with guidance on the specific development challenges in these different areas.

IV. SNA – SEEA: Concepts and coverage

22.   The SEEA accounts, as mentioned earlier, are built on the structure of the national accounts. Economic data are generally organized primarily by administrative units such as nations or local governments within a nation or by groupings of like economic agents such as households for corporations. However, data on biophysical aspects of the environment may well

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[2] Reference in SNA 2008

have as fundamental classifications geo-spatial regions of *like* characteristics or the habitats of *like* species. It is almost certain these do not correspond with the administrative units used in economic data.

23.   Since the majority of the accounts in SEEA-CF are based on SNA concepts using the primary structures of the SNA – sectors, industries, products – the alignment of environmental data sets for bio-physical and/or geo-spatial information may require considerable effort in the early stages. Geographic information systems (GIS) can be important in this regard. The Technical Note on Land Accounts addresses some of the initial points in this domain.

24.   While the data requirements for SEEA accounts largely center on the flows to and from the environment and the stocks of natural resources, SEEA also calls for the recognition of flows of importance to environmental activities that in the SNA are considered secondary or ancillary activities and not explicitly recorded. Data sources that can identify or be used to estimate these flows will need to be found.

25.   For example, there can be significant flows of energy products that are consumed within the producing enterprise. These need to be considered for SEEA when considering the overall balances of energy (and associated residual) flows into and out of the economy, but are not explicitly recorded in the product balances in the SNA.

26.   A basic concept in the national accounts is the residency principle – that is the SNA covers the transactions of all resident units. Some environmental data sets are likely to cover the physical flows and associated activities within the boundaries of the country. To align with the SNA, these flows will have to be lowered by those undertaken by non-residents within the country and supplemented with the flows outside the country undertaken by residents.

27.   A particular case that may be important, is that of goods sent abroad for processing. The SNA does not record these flows as exports and imports as the ownership remains within the originating economy. However, SEEA calls for the recording of these flows as there can be significant use of energy or transformation of energy for example if oil is sent abroad for refining.

28.   While these are relatively few adjustments needed to the SNA data used for SEEA, they can be significant and for particular accounts may require supplementary data sets to be developed.

V. Building an accounts based program

29.   The benefits of an accounts based program of statistics have been discussed above. The SNA, as a long standing example of such a program, has built up a considerable experience in integrating data from a wide variety of sources to produce sound integrated data sets used for analysis and policy formulation. The application of the techniques and methods already in use for the national accounts will provide a good foundation for the development of integrated environmental economic accounts.

30.   Integrating data when fundamental building blocks come from a wide variety of different sources will require considerable initial work and thus it will be important to consider from the outset how the processes involved can be standardized and harmonized such that future cycles of data integration can be made more efficient.   This will also contribute to data quality by assuring that the primary data sets are created increasingly with a view to supporting the integrated data products that are needed by policy makers.

31.   The international statistical community has established the Generic Statistical Business Process Model (GSBPM)[3] as a common basis for developing and operating any statistical program. When initiating a new program such a SEEA accounts, it is important to consider the structure of the whole model and how existing resources within the agency developing SEEA accounts or other related agencies can be brought to bear on each of the phases of program development.

32.   Applying the GSBPM to the SNA accounting requirements generates a presentation of the phases with sub-processes described in national terms appropriate for the development and operation of a SNA program. The diagram below provides such a presentation[4]. In the development of an accounts based program such as the SNA or SEEA, it is important to understand that the model must be applied to different stages of the production process in a layer fashion which means the overarching management phase is essential in promoting harmonization and integration of processes.

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[3] Add footnote on Stat Commission endorsement.
[4] This diagram is based on the Generic Statistical Business Process Model, Version 5.0, United Nations Economic Commission for Europe (UNECE)

SNA and SEEA Generic business processing model

Overarching Management Functions Common standards, metadata and archiving processes Common registers and frames Management of data integration across agencies and programs Common processing Common Dissemination							
1 Specify Needs	2 Design	3 Build	4 Collect	5 Process	6 Analyze	7 Disseminate	8 Evaluate
1.1 Determine needs based on international standards/ requirements and user needs within institutional context	2.1 Design Output Structure – types of accounts to produce and frequency	3.1 Build input data processing systems and specify arrangements for transfer of data from source organizations	4.1 Select time period for transfer of input data files	5.1 Derive SNA and SEEA variables from processed input source data including direct transformation, projectors, interpolation techniques etcetera	6.1 Prepare output files	7.1 Update output systems	8.1 Gather evaluation inputs
1.2 Consult and confirm needs with main m users	2.2 Design variable descriptions based on data availability and quality of input data	3.2 Build output data processing systems based on design of output product	4.2 Transfer needed input data files from sources	5.2 Integrate variables in supply and use tables and into Sequence of Accounts	6.2 Validate output files	7.2 Produce dissemination products	8.2 Conduct evaluation
1.3 Establish output objectives based on supply and use table and sequence of accounts structure and 2008 SNA and SEEA 2012 concepts	2.3 Design input collection methodologies for survey data, administrative data, geo-spatial data or purchased databases	3.3 Test production system consisting of the input and output systems	4.3 Run input processing to transform inputs to SNA and SEEA concepts, classifications and variable specification	5.3 Review, Validate and edit tables and accounts using identities, supply use analysis and quality controls	6.3 Scrutinize and explain	7.3 Manage release of products	8.3 Agree on action plan
1.4 Check availability of data	2.4 Design production systems and workflows	3.4 Finalize Production system	4.4 Finalize input data gathering	5.4 Finalize data files	6.4 Apply disclosure controls	7.4 Promote dissemination products	
1.5 Prepare business case					6.5 Finalize outputs	7.5 Manage user support	

33.   The importance of established common processes and working arrangements and, the resulting benefits to the production of integrated data sets has been raised in a number of important international initiatives and supported by the United Nations Statistical Commission[5]. These efforts have established a set of organizational principles (see Box 1) and common services (see Box 2) that can provide a foundation for setting up a new statistical program such a

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[5] At the time of writing this note, a number of initiatives were underway or planned to further promote the use of common processes within and across countries. Given the evolving reality of the work on common processes, readers are encouraged to refer to the web site of UNSD as well as other international organizations for the latest advances on this topic.

SEEA accounts. More broadly these principles should be appreciated as being part of the modernization of the national statistical system taking into account aspects of efficiency and response burden through a collaboration of the statistical and other administrative communities.

Box 1: **General organisational principles for institutional arrangements**

The institutional settings (e.g. the degree of centralization or de-centralization of statistical production, the management culture and the quality of the IT-environments) play an important role in the building blocks for the development and implementation of integrated systems. By advancing general principles for the institutional arrangements, it is proposed that organizational constraints are addressed. The following points are key principles to be considered in building any integrated data system such as SEEA. Reference: conference on transformative agenda

- Use of corporate business and information architecture
- Adopt and update legal mandates based on fundamental principles for official statistics
- Mainstream standards and metadata
- Optimize use of administrative data
- Maximize multi-use of data
- Top down editing and imputation
- Initiate methodological innovation and modernization through harmonisation
- Develop modular IT-applications across statistical domains and across agencies to allow automated data exchange
- Establish quality culture
- Manage development and change

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34.   While the focus of these Technical Notes is on the short run goal of getting a program of SEEA accounts up and running, there will also be guidance on longer run issues so that longer term development can benefit from the initial preparation of these integrated environmental and economic accounts. Ideally each organization involved in developing these integrated accounts will consider how its fundamental data gathering systems and processes may be adjusted to support future data exercises.

35.   A basic step in using a common business and statistical architecture is the application of the GSBPM for describing systemically the statistical production processes for the preparation of SEEA accounts. With its application, the statistical processes are systemically documented and synergies identified with existing statistical processes and new processes for the compilation of SEEA accounts. A functional matrix organization by SEEA account will allow for the application of organizational principles for cross functional operations for: data collection and processing of survey, administrative, geo-spatial and other data; methodology (e.g. sampling,

integrated survey design, data transformation, editing, verification, and dissemination) and IT systems (e.g. input and output databases and data and meta data exchange protocols).

36.   Compilers should consider the application of these organizational principles before setting out to establish a program of SEEA accounts. For example, familiarization with the mainstream standards used in the SNA and the SEEA and any environmental data sets under consideration for use in building SEEA is fundamental. This will be important in being able to use the metadata for any existing data sets to assess the potential for their use in SEEA and determine the level of coverage and potential adjustments needed or data gaps that may exist.

37.   Also, consideration of response burden is the basis of the two principles that call for the maximum use of administrative data and the multi-use of data in general. Existing data sets with the potential to contribute significantly to the new SEEA data requirements should be considered before moving to collect additional data. This may require significant preliminary research involving establishing contact with a variety of other agencies to learn what data sets exist and the potential value for SEEA accounts.

38.   These organizational principles should also be kept in mind where, as will often be the case, a SEEA program is initiated with the estimation of only one or a small number of accounts. In such cases these initial efforts can provide valuable lessons for future development and identify where data sets and processes developed for these initial accounts may be re-used for accounts to be developed later. Compilers should also be on the lookout for opportunities to use these newly acquired data sets and processes to enhance existing programs in other domains. For example, administrative data acquired for SEEA may also have information of potential value for economic accounts and its use might free-up resources for subsequent SEEA development.

39.   In establishing a new program such as SEEA, the initial preparatory phases of the GSBPM model are crucial. First, in phase 1, one must clearly establish the analytical and policy needs that are to be met by the new statistics. Given resource constraints and the good developmental practice of incremental development, initial development may well focus on one or a few accounts. In determining where to start, it is imperative to establish the policy needs for indicators and aggregates to be derived from the various accounts. Combining the policy priorities with information on existing data available to populate the accounts, will be important in establishing a business case for initial development.

40.   In the case of a new accounts program, there are two levels of data needs that should be considered. For example, for a complete set of supply-use accounts, one needs estimates of all sources of supply and use. However, some of the sources and uses will be relatively small and possibly insignificant, and thus can be estimated using related flows or in some cases modeling. It is important is to establish which flows are crucial to the successful presentation of an account and how these can be addressed by existing data sets.

41.   In a case where existing data of sufficient quality exists for the principal flows, then it may be possible to move immediately to the next phases of GSBPM, design and build for the required account. However, if current data sources are not judged sufficient, either in coverage or quality, to allow the successful estimation of a specific account, then moving on to design and build phases for this account will have to wait. A program to develop these basic data needs for the program should be initiated based on GSBPM and the principles discussed above.

42.   Existing organizational and program responsibilities may mean that establishing a program to fill such data gaps falls under the responsibility of another program or agency. This may mean that establishing good institutional arrangement will be an important aspect. Such arrangements generally have two levels of activity, the working and technical relationships between compilers and professionals in the other agencies and a supporting set of management relationships at senior levels for steering purposes.

43.   These institutional arrangements such as a national steering and related technical committees for the implementation of the SEEA accounts can take some time and effort to establish, but are essential to the successful implementation of a program of integrated statistics such as SEEA.

44.   While it is beyond the capacity of this note to discuss all of the steps in GSBPM, it is important to consider the use of corporate services in undertaking the steps in the model. The use of common services such as those listed in Box 2, can help to bring consistency to the data set to be integrated and also lead to efficiencies in process operations.

Box 2: Corporate services in organising statistical production processes

In the statistical production process, there are several over-arching processes that apply throughout all phases and across different statistical business processes. Here some of those that have a statistical component are mentioned. The centralisation of the statistical processes in corporate services contributes to the efficiency, effectiveness and quality of these processes[6].

- Standards and metadata (Bureau of Standards)
- Population and business registers and frames
- Data collection and processing
- Dissemination
- Methodological innovation and process development
- IT services
- Project management

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[6] Road Map, A Guide in 12 Steps for the Design, Development and Implementation of an Integrated System of Economic & Environmental Statistics, United Nations Statistics Division

45.   A good example of an important common service from economic statistics is the need for a single integrated statistical business register (SBR) to support all economic surveys. While the benefits of a single SBR are well recognized for economic statistics, developing environment-economic accounts may mean that additional information is required on the SBR. For example, major producers and users of water may need to be identified on the SBR. Given that for some enterprises that are major users of water, water production is likely a secondary activity, current SBRs likely do not identify this secondary activity which will be important for compiling SEEA accounts. The enhancement of a central SBR is much better for long term development of integrated data than the creation of separate specialized frames.

46.   The use of common standards and metadata practices can also be very important in minimizing the need for adjustments and contribute to the efficiency and quality of production processes. Particular in cases where existing data is brought in to populate SEEA accounts, classification and other dimensions of the data or administrative programs may well differ from the standards use in the SNA and SEEA. While it may take some time to move to common standards, it is important to document the differences and ensure that adjustments are consistent through time and across various processes and accounts.

47.   As already mentioned, the aim should be to use existing data sources as much as possible. The data from these sources should be gathered using common interchange processes that gather both the data and associated metadata. It is important to have verification processes in place to ensure the data is as expected particular for data from other agencies as they may have to change formats or content for their own purposes. This stage should also encompass the processes for transforming the data to units and concepts to be used in construction the accounts.

48.   While space does not allow a discussion of all common services that should be considered, establishing common methodologies across the accounts and the implementation of processing in common modular IT-systems have proven to be very important in developing efficiencies and improving the quality and associated metadata for data sets where these principles have been applied. Compilers are strongly urged to work with colleagues to implement such common systems and processes as opportunities arise.

49.   Compilers are also urged to ensure that sound project management practices are employed in the development of the accounts and associated common series and processes. Establishing a sound project plan with the necessary oversight and clearly defined milestones is essential in establishing a new program. This is particularly the case for a complex program involving inputs from a number of programs and agencies.

VI. Compiling and disseminating initial accounts

50.   At one level, this objective of this phase is quite self-explanatory but, of course, it contains the majority of the technical and measurement challenges that must be confronted in the implementation process. This overview Technical Note will discuss the issues in broad terms only. Account specific information is covered in the remaining SEEA Technical Notes for particular subjects (see list in Annex). These Technical Notes provide an overview of the main measurement objectives and issues for each specific topic and links to relevant supporting materials and examples.

51.   A general ambition in the implementation of environmental-economic accounts should be to develop experimental or preliminary accounts at a summary level and available data to start the process of both displaying the potential of the approach to users and building an understanding of compilation using an accounting approach. This learning by doing is an essential aspect of implementation and should include the release of preliminary data to encourage feedback from as broad a constituency as possible.

52.   Given the importance of learning by doing, it is recommended that consideration be given to developing processes as prototypes if existing common systems and processes are not available. Prototyping allows the creation of the initial data in a relatively timely way but also allows for the incorporation of lessons learned in subsequent production rounds. When moving to establish ongoing processes it will be important to look across the needs of all of the accounts to develop common processes and systems.

53.   Based on feedback and increasing confidence in compilation it should be possible to progressively develop any set of accounts to improve the data quality, augment the degree of detail in response to user demands, and ultimately expand the range of accounts.

54.   Often the link between SEEA information and policy discussions will be reflected in the preparation of aggregates and indicators derived from a SEEA based account. Thus, while it is normal for the SEEA compiler to focus on the many detailed and varied data and measurement challenges that will be confronted, it is also essential that the compiler understands and presents the relevant aggregates and indicators.

55.   The specific Technical Notes each define one or more Core Tables that are proposed as a minimum level of reporting that may be expected across nations. These core tables support a set of indicators and aggregates applicable to policy needs. While the Core Tables will form the basis for developing a set of international reporting requirements, it is expected that individual countries will want to develop more detailed accounts and tables in many cases so as to address the particular data and policy needs of national users.

VII.   Data Quality

56.   It is essential to have in mind throughout development the requirement for metadata and information on the quality of the outputs which is an important element of the GSBPM. It needs to be stressed that for any statistical program, the joint dissemination of the data and the metadata is essential so that users can use the information appropriately. It is also, essential for the ongoing evaluation and improvement of the data program itself.

57.   Metadata is essential to programs calling for significant integration of data such as is the case for SEEA and the national accounts. This includes not only assuring that the program itself produces and disseminates good metadata but also, that suppliers of basic data inputs have good metadata to support the integration process. Without sufficient metadata, it will be difficult to develop the appropriate coverage, concept and quality adjustments required to bring the wide range of source data used for some accounts into alignment for the estimation of the accounts.

58.   The growing demand for indicators that combine data from the economic, environmental and social domains further highlights the importance of good metadata that is accessible to a wide audience. Also, access in electronic format is essential in this internet age.

59.   Recent years have seen a number of initiative aimed at promoting and standardizing the preparation and dissemination of metadata and quality information in general. Initiatives such as the Data Documentation Initiative (DDI), Common Warehouse Model (CWM), the General Data Dissemination System (IMF – GDDS) and the Special Data Dissemination Standard (IMF-SDDS) in conjunction with the advancement of international standards such as the Metadata Registries (ISO 11179), Geographic Information Systems (ISO 19115) and the Statistical Data and Metadata Initiative (SDMX—ISO 17369) have led to significant advances in the area of metadata.

60.   Since one of the aims of setting out Core tables in the SEEA Technical notes is to assist with the development of an international reporting process, it is important to consider that international reporting of statistics includes the reporting of the associated metadata. Thus with the development of any new program consideration should be given to the above standards, in particular SDMX which is increasingly being used for such reporting.

61.   As the GDDS, SDDS program of the IMF suggests, the development of metadata programs should be seen as a progression. As statistical programs are developed and enhanced the initial basic metadata should also be enhanced and expanded.

62.   In this spirit, the Metadata Annex proposes a list of basic metadata elements based on the work done at Eurostat. It is recommended that the majority of these metadata elements should be available for all data. Eurostat has developed a full template for these metadata elements (see Annex for link) and countries are encouraged to consider these elements when establishing any metadata systems.

VIII. Looking Ahead

63.   The development of an ongoing programme of work on the SEEA is likely to benefit substantially from work that may be undertaken to develop and modernize a country's national statistical systems. Thus improvements in the operations for surveys, the development and improvement of business registers, efforts to improve co-ordination between agencies, and work to apply common classifications across multiple data sources, are all good examples of national statistical system initiatives providing benefits to SEEA implementation.

64.   The development of a SEEA program may also provide opportunities to more broadly apply and test the application of the organizational principles outlines in Box 1 for purposes of modernizing the national statistical system, particularly if the program is starting from scratch. Also, developing new systems and operational processes for the SEEA accounts and potentially required additional data collection, can be an opportunity to establish and test new or expand corporate services such as those identified in Box 2.

65.   The following diagram that presents the GSBPM model at a high level but reflects the circular production evident in most accounting applications and the feedback from evaluation to subsequent design and build phases.
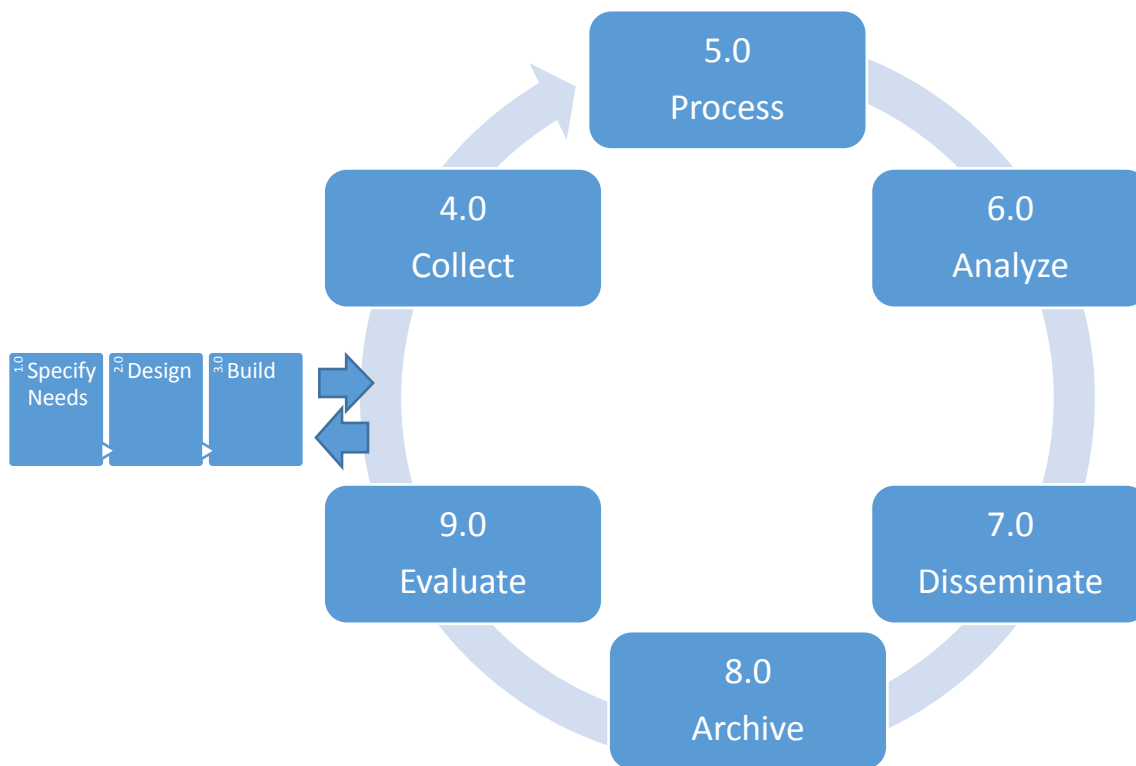
66.   While in general phases 4 through 9 are carried out each production cycle and often multiple times, phases 1 through 3 are often undertaken less frequently. However, when establishing a new program employing the recommendation above to use prototypes in early production cycles, it is important to feedback to the design and build processes in a timely fashion.

67.   This is also true if the SEEA development is being used to test common processes as part of a broader program of harmonization and standardization of statistical production processes.

68.   It should also be noted that since accounting based programs integrate a wide variety of data and confront them in a structured format including balancing identities, the evaluation of the accounts can also provide valuable information back to the design stages of programs providing data inputs to the accounts.

69.   Given that SEEA accounts generally involve collaboration among multiple agencies, it may also present an opportunity to establish corporate services that serve more than one agency, providing benefits at a broader level. Two particularly important examples are the establishment of common registers (for land, businesses and households) as frames for statistical actives across all official statistics and increased adoption of international standards and metadata protocols across all agencies producing official statistics. These two opportunities can provide significant returns over the medium term in the form of reduced operating costs and more coherent data to inform policy and other decision makers.

70.   Common accounting frames and classifications for the various SEEA accounts will establish the foundation for filling in data gaps as statistical programs evolve and are updated. However, establishing strong partnerships within and across agencies is important so as to maintain ongoing communications essential in identifying potential low cost opportunities for data improvements such as filling in data gaps.

71.   As noted, the ambition in implementation of the SEEA is to set up an ongoing compilation and dissemination program. As part of this longer-term process, extensions to the initial work program could include:

- If necessary, developing legal and institutional arrangements for producing environmental accounts and supporting statistics
- Establishing the nature and frequency of the accounts and related key indicators to be produced
- Establishing data sharing agreements and service level agreements between data produces and compilers of the accounts
- Capacity building for both data producers (in compiling accounts) and data users (in analytical and policy use)

- Establishing or modifying data collection (surveys, registers and frames, environmental monitoring, geo-spatial information)
- Changing classification systems or creating correspondences between existing classifications,
- Developing a National Compilation Guide that provides detailed instructions to compilers on the sources of data and the procedures to be used in their compilation
- Establishing or modifying IT infrastructure to facilitate data exchange and production of the accounts
- Determining timelines for implementation
- Establishing a dissemination process including communicating key findings and making datasets broadly available and
- Undertaking risk assessments of the ongoing compilation of accounts, particularly with respect to the availability of critical supporting statistics.

IX. Conclusion

72.   The establishment of a program of Environmental-Economic Accounts may seem a formidable challenge, but it is important to break down the task into manageable components using GSBPM, to establish the appropriate institutional arrangements and statistical production process and to determine medium term goals and commitments that align with the existing data capacity and policy needs of the country. Learning by doing is an essential element in successfully advancing the implementation of such a program and the first steps should be modest and well planned to establish a foundation for continued development.

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Annexes I   List of specific SEEA Technical Notes

Available

1. Land
2. Water
3. Energy
4. Air emission
5. Environmental goods and services
6. Environmental protection expenditures
7.

Forthcoming

8. MFA and waste
9. Forest
10. Environmental taxes and subsidies
11. Minerals
12. Aquatic resources
13. Tourism
14. Agriculture
15. Nutrient and phosphorous balances
16. Carbon accounting
17. Biodiversity accounting

Annex II   Metadata

The need to create and maintain up-to-date metadata is important for all statistical programs. Below is a list of elements from a template used by Eurostat to present metadata. Examples with the full set of metadata elements can be seen on the Eurostat Web site at http://ec.europa.eu/eurostat/web/environment/overview by clicking on the metadata symbol.

1. Contact (Name, address, phone, e-mail)

2. Metadata update (when metadata was updated))

3. Statistical presentation

       3.1. Data description
       3.2. Classification system
       3.3. Coverage – sector
       3.4. Statistical concepts and definitions
       3.5. Statistical unit
       3.5. Statistical unit
       3.7. Reference area
       3.8. Coverage – Time
       3.9. Base period

4. Unit of measure

5. Reference Period

6. Institutional Mandate

       6.1. Institutional Mandate - legal acts and other agreements
       6.2. Institutional Mandate - data sharing

7. Confidentiality

       7.1. Confidentiality – policy
       7.2. Confidentiality - data treatment

8. Release policy

       8.1. Release calendar
       8.2. Release calendar access
       8.3. Release policy - user access

9. Frequency of dissemination

10. Dissemination format

       10.1. Dissemination format - News release
       10.2. Dissemination format – Publications
       10.3. Dissemination format - online database
       10.4. Dissemination format - microdata access
       10.5. Dissemination format – other

11. Accessibility of documentation

      11.1. Documentation on methodology

      11.2. Quality management – documentation

12. Quality management

      12.1. Quality assurance

      12.2. Quality management – assessment

13. Relevance

      13.1. Relevance - User Needs

      13.2. Relevance - User Satisfaction

      13.3. Completeness

14. Accuracy

      14.1. Accuracy – overall

      14.2. Sampling error

      14.3. Non-sampling error

15. Timeliness and punctuality

      15.1. Timeliness

      15.2. Punctuality

16. Comparability

      16.1. Comparability – geographical

      16.2. Comparability - over time

17. Coherence

      17.1. Coherence - cross domain

      17.2. Coherence – internal

18. Cost and Burden

19. Data revision

      19.1. Data revision – policy

      19.2. Data revision – practice

20. Statistical processing

      20.1. Source data

      20.2. Frequency of data collection

      20.3. Data collection

      20.4. Data validation

      20.5. Data compilation

      20.6. Adjustment

21. Comment