



ESA/STAT/AC.301
UNCEEA/10/3a

DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS

**Tenth Meeting of the UN Committee of Experts on
Environmental-Economic Accounting
New York, 24-26 June 2015**

**SEEA and Transforming Global and National Statistical Systems for
Monitoring SDG Indicators**

Draft paper prepared by UNSD

(for discussion)

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1. Introduction

1. The post-2015 development agenda and the adoption of the Sustainable Development Goals (SDGs) and targets to drive that agenda represent a fundamental shift toward integration of a multitude of policy issues into a single policy agenda. This single policy agenda is based on the backdrop of international development strategies and programmes articulated in a sequence of major UN conferences and summits, each addressing specific policy issues. Member states and supporting international agencies will have a key role to play in the integration of the individual development strategies and programmes under the umbrella of sustainable development programmes in countries. In parallel, the statistical community faces similar challenges in developing an integrated and multi-purpose information system in support of policy analysis and decision making for sustainable development. At present, national and global statistical systems are confronted with statistical legacy systems characterised by siloed production processes of data. There is therefore a historic opportunity to transform the national and global statistical systems through the adoption of common statistical frameworks which are systemic in nature, along with a standards-based modernization of statistical production processes. The upshot of this transformation will be improved data quality, coordination, integration and alignment of various monitoring and reporting initiatives.

2. One key aspect of meeting the Sustainable Development Goals is the ability of countries to effectively and sustainably monitor progress towards meeting defined targets through the use of relevant indicators. The Inter-Agency and Expert Group on the Sustainable Development Goals Indicators is tasked with developing a monitoring mechanism for the SDGs which adequately reflects the policy agenda, respects countries' capacity constraints to report on indicators, and strives to facilitate national ownership of country data and globally reported SDG indicators. In addition, an increasingly integrated approach to policy decisions, based on a better understanding of the interactions and trade-offs between different realms of sustainability calls for an improved system of information which integrates social, economic and environmental information.

3. In the context of the abovementioned issues and corresponding policy needs for integrated information, this paper considers the integration of economic and environment related statistics, and the role of the System of Environmental-Economic Accounts as the necessary conceptual framework to this end. It discusses the establishment of integrated economic and environmental statistics at the national level, and corresponding benefits accruing to national and global policy-making and the SDG monitoring process. In conjunction, it lays out a transformative roadmap for aligning SDG monitoring mechanisms with the statistical standard of the SEEA. A more detailed transformative analysis and roadmap will need to be developed for each thematic area relevant to the SEEA methodology, with a preliminary analysis for the case of water provided as an annex to this paper.

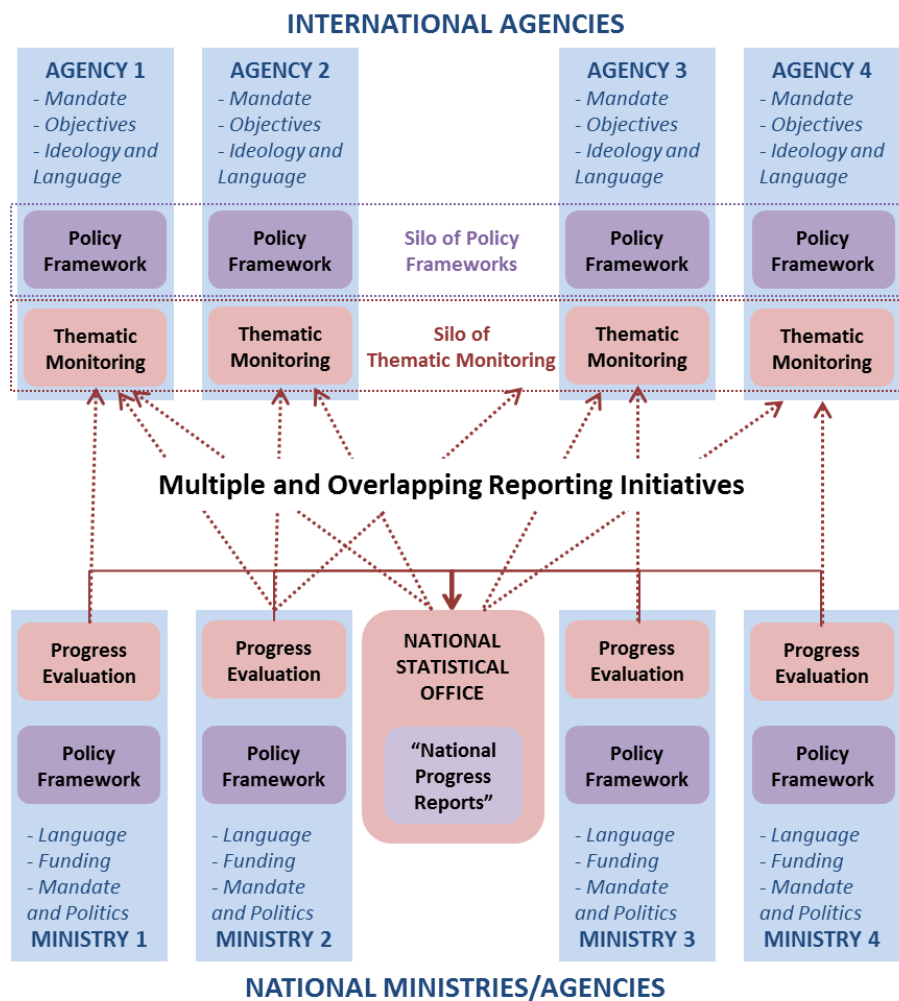
2. Global Landscape of Policy, Institutions and Statistics for Sustainable Development

2.1 Policy, Institutions and Statistics: A Silo Structure

4. The evolution of the international development agenda and community of practice established to address it has resulted in a structure of individual policy frameworks and implementing agencies at

the international level. The legacy system in place is a result of distinct economic, social and environmental concerns arising over time, with policy frameworks being established along with the provision of a mandate within the international development community to an existing or specially established agency to implement said framework. The result is a wide array of international agencies which exist with a specific mandate to pursue a ‘unique’ set of objectives and priorities. While these agencies all co-exist within the United Nations and broader international development system, initiatives remain relatively isolated within established organisational structures, with stove-piping occurring both across agencies and between programmes within agencies. This will require significant institutional and thematic integration to maximise progress toward sustainable development in an increasingly complex and globalised world.

Diagram 1: Silos of Institutions, Policy and Statistics



5. This silo structure of international development is reflected on in the statistical sphere, by which individual international agencies engage in thematic monitoring with the aim of evaluating progress to ensure effectiveness and accountability in the fulfilment of their defined objectives. The result is that many international agencies conduct their own, distinct programmes of monitoring in the form of in-country surveys, country assessments and modelling of data for global data sets, as well as specific requests from countries to report progress on issues within their programme.

6. This silo structure of institutions, policy frameworks and statistics in international development as depicted in the top half of diagram 1 is compounded by funding mechanisms. As

funds are earmarked for specific issues, organizations benefit from strategic positioning as the lead agency within a thematic issue. As a result, they become focussed on addressing very specific policy concerns in a targeted and direct manner. This can result in unintended consequences for other sectoral/thematic issues, as well as a loss of synergies between international development efforts. Despite attempts to improve coordination and cooperation between different international organizations, challenges remain, including the perceived threat of losing organisational and programme identity or strategic positioning. Additional challenges include barriers to coordination such as a lack of common language inhibiting joint programme development and unreconciled differences in priorities, outlooks and goals.

7. The identified ‘silo structure’ to formulating policy frameworks and positioning institutions to address specific sectoral/thematic issues is mirrored in the organization of national policy, implementing institutions and statistics. Ministries are typically set up and mandated to focus on specific set of issues, and corresponding policy frameworks and performance management structures are set up in isolation within each ministry to respond. As a result, each ministry is responsible for the collection of sector specific data using the appropriate methodologies and structures to respond to their performance management needs (including the calculation of indicators). As depicted in Diagram 1, the collection of basic data and compilation of indicators is therefore siloed within agencies. In many cases, and depending on the level of centralisation of the National Statistical System, this information is also fed into the National Statistical Office.

8. The links between initiatives at the international and national level are deep. Different international organisations have different entry points in countries (in the form of partner ministries and agencies), which are built on an often long history of technical assistance and cooperation based on a common language. The reflection of these links in the statistical sphere is that different national ministries respond to requests for information from different international monitoring initiatives, be it through the reporting of nationally compiled statistics or cooperation with international technical experts to derive modelled data.

2.2 Policy, Institutions and Statistics: Towards Integration

9. Sustainable development by definition requires a balancing of competing concerns through a combined consideration of multiple social, economic and environmental factors to increase the impacts and outcomes of the policies. Calls for greater policy integration are made in order to avoid fragmented decision making, which risks unexpected and often unwanted consequences on other areas relevant to achieving sustainable development. A lack of integration across sectors has long been identified as being a major impediment to previous approaches to sustainable development, as failure to account for trade-offs and synergies across sectors has resulted in incoherent policies, adverse impacts of sectoral development policies on other sectors, and ultimately in diverging outcomes and trends across broad universal and transformative objectives for sustainable development.¹

10. Integrated policy making refers both to the need for horizontal sectoral integration between different sectors, and vertical integration between different tiers of government and decision making. A number of elements are necessary for policies to become integrated, including a comprehensive inclusion of all issues over time and space, the establishment of a framework in which policy components are consistent and act in agreement, and an agreed set of overarching criterion to evaluate

¹ David Le Blanc, ‘Towards Integration at Last? The Sustainable Development Goals as a Network of Targets’, DESA Working Paper No. 141 ST/ESA/2015/DWP/141, March 2015

different policy elements.² In this context, the Sustainable Development Goals proposed by an Open Working Group of UN Member States in 2014 represents an effort to develop a policy agenda which is both sustainable and inclusive for all groups over time, and which consistently addresses all issues pertaining to sustainable development.

11. When implementing this integrated policy agenda, significant efforts will need to be made to strengthen links and enhance synergies between international policy frameworks, many of which already exist and implement elements of the post-2015 development agenda, so as to avoid further overlapping of efforts and conflicting programmes of work. The conceptual integration of policy issues must be supported by a higher degree of interaction, compatibility and interdependency of international organisations, going beyond traditional efforts to communicate and coordinate towards developing an integrated programme of work based on overarching objectives and performance criterion. This requires a significant degree of commitment and willingness from international organizations.

12. In parallel to this, there is a need for integration of the statistical mechanisms used to monitor and inform sustainable development, both at the international level and within the national statistical system. A key element of encouraging integration of policy initiatives and programmes across agencies is the development of a common information set and agreement on the overarching criterion and method to evaluate progress to enable shared performance management. This is further elaborated in section 3.1.

13. An illustration of an alternative structure which is likely to arise if efforts to integrate both policy, institutions and statistics are pursued is laid out in diagram 2, in which individual international agencies' policy frameworks are components of an integrated policy architecture for international development based on the SDG agenda. At the national level, ministry-level sectoral policies are part of an integrated national development plan, supported by international agencies. Integration of policy across sectors is further supported by an integrated national statistical information system, which responds to national and international requests for information in a coordinated and efficient manner. This is further discussed in section 3.1 and 3.2.

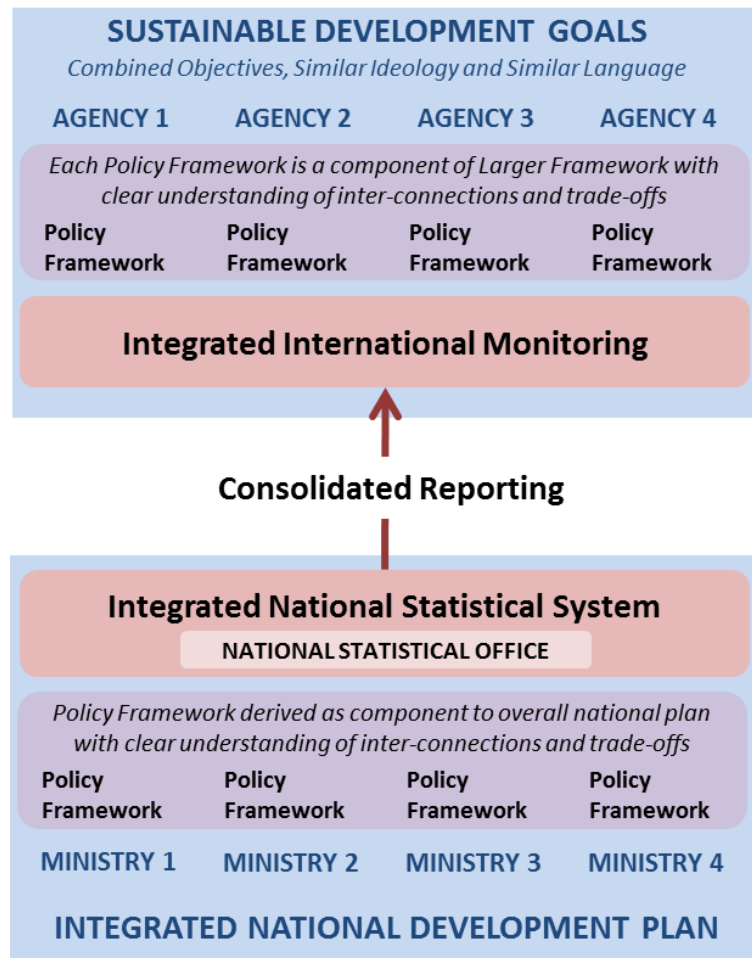
14. As suggested in diagram 2, integration of statistics for sustainable development is needed along two different lines. Firstly, integration concerns the bringing together of different types of statistics produced within the national statistical system into one integrated information system. Statistics collected within different sectors and by different agencies must be brought together in an integrated way to adequately highlight the inter-linkages and trade-offs between relevant sectors to inform sustainable development driven decisions. We will term this notion '*horizontal integration*' based on the need to break down walls between different silos of information production to create one integrated information system. Horizontal integration is depicted in diagram 2 as the creation of an integrated national statistical system.

15. Secondly, the global process of monitoring and reporting, starting from the level of government agencies collecting data to the derivation of global SDG indicators, should be integrated to the extent that the conceptual framework is consistent throughout and the reporting mechanisms are consolidated into one coherent process. We will term this notion '*vertical integration*', based on the need to establish a coherent 'monitoring and reporting link' between national and global initiatives.

² Meijers, Evert, and Dominic Stead. "Policy integration: what does it mean and how can it be achieved? A multi-disciplinary review." *Berlin Conference on the Human Dimensions of Global Environmental Change: Greening of Policies-Interlinkages and Policy Integration*. Berlin. 2004.

The goal is that the advocacy and policy initiatives at the international level do not become detached from the information and implied policy priorities derived from nationally collected data. ‘Vertical integration’ is depicted in diagram 2 as the consolidation of reporting initiatives into one process.

Diagram 2: Integrated Institutions, Policy and Statistics



16. Based on the above discussion the following section will discuss the extent to which integration of environmental-economic statistics is needed to respond to policy needs for sustainable development, and the manner in which such integration can be achieved through the adoption and implementation of the System of Environmental Economic Accounts (2012) as the conceptual framework for monitoring the environment for the post-2015 development agenda. The considerations below are of primary relevance to the deliberations of the Inter-Agency and Expert Group on SDGs tasked with the development of the monitoring and reporting mechanisms for the post-2015 development agenda. While the technical illustrations and examples are based on the case of environmental-economic statistics, it is likely that issues raised in the following sections are universally relevant.

3. Integrating Environmental-Economic Statistics

3.1 Policy Needs

17. As identified in the previous sections, a lack of well accepted and integrated information concerning the main pillars of sustainable development (i.e. the economy, environment, society and governance) is a significant barrier to formulating integrated sustainable development policy. Given the wide variety of sectorial policies which are characterized by externalities or unintended consequences affecting the environment, integration of environmental policy is a particularly crucial step for sustainable development. Policy makers must develop an understanding of the interdependencies between the economy and environment, including the impact the economy has on the long term health of natural systems.

18. Environmental management concerns are characterised by significant inter-linkages between different natural systems which must be properly understood in order to develop policies which address the system as a whole, internalising previously undetected externalities and taking into account the full impact of potential policy responses (i.e. including potential indirect consequences on other natural systems). For example, water, energy and food production have been identified as inextricably linked as described in box 1, despite the fact that these challenges are often addressed within in isolation sectoral boundaries. Recognizing these synergies and balancing these trade-offs is central to jointly ensuring water, energy and food security, such that decision-makers responsible for individual sectors consider broader influences and cross-sectoral impacts.³

Box 1: Water-Energy-Food Nexus: Water is an input for producing agricultural goods in the fields and along the entire agro-food supply chain. Energy is required to produce and distribute water and food: to pump water from groundwater or surface water sources, to power tractors and irrigation machinery, and to process and transport agricultural goods. Agriculture is currently the largest user of water at the global level, and food production accounts for about 30% of total global energy consumption. There are many synergies and trade-offs between water and energy use and food production; 1) using water to irrigate crops might promote food production but it can also reduce river flows and hydropower potential, 2) growing bioenergy crops under irrigated agriculture can increase overall water withdrawals and jeopardize food security, and 3) converting surface irrigation into high efficiency pressurized irrigation may save water but may also result in higher energy use.

19. Recognising and understanding these synergies and building them into sectoral policy analysis and design is made difficult by the fact that the information on food production, water and energy is produced within sectoral silos. In general, responsibilities for the collection of environmental data are often dispersed across multiple ministries and agencies, each employing their individual practices and methodology for the collection and compilation of data based on their perceived sectoral needs. The result is that each agency collects the data specific to their policy agenda, and this information remains contained within sector silos. Other related sectors are both unable to access said information, or properly understand the methodology used to collect it.

20. The production of integrated information on the environment and its relationship with the economy and society is therefore a prerequisite for policy makers to be able to make decisions within one integrated framework, which takes into account the impacts their sectoral policies may have on other sectors. For example, decisions on the payment of subsidies for water intensive energy crops

³ World Water Development Report 2014

paid by a Ministry of Agriculture should consider the impact this will have on water resources used for other purposes including the production of energy from other sources (e.g. hydropower from river flows) as well as production of food. This information may not be available or readily understandable to the Ministry of Agriculture, as it remains dispersed across water and energy agencies, and perhaps even contained within scientific bodies and universities, all of which may use divergent methodologies.

21. Even if this data were available, agencies risk mis-interpreting data compiled by other users resulting in policy mistakes due to the fragmentation of methodologies used in the compilation of environmental-economic statistics across agencies. This also makes it difficult to use other sectoral information in modelling for policy analysis, as the data are compiled based on different concepts, assumptions and definitions making reconciliation difficult. For sectoral policy decisions to be made in an integrated way, which when combined result in effective integrated policy for environmental management, a mutually reinforcing interpretation of the available data by different sectoral decision makers is necessary. This allows decision makers to focus on formulation of the appropriate policy rather than determining the state of the related natural systems and how they are inter-connected.

22. In addition, international agencies typically collect their own data using individual methodologies, thereby basing the design of their policy frameworks on separate information sets. Evaluation of programme effectiveness is similarly measured in isolation. Moves towards breaking down international agency silos require policy frameworks to be designed in an integrated way. For this integration to be successful, framework design should be based on agreed sets of information. Similarly, the evaluation of performance to ensure that the implementation of policies is synergistic should build a common evaluation system based on combined results. This requires the establishment of a common and integrated information system which picks up the interlinkages between policy frameworks.

23. In sum, integrating environmental-economic data into one set of information based on one methodology is a prerequisite to enable policy makers operating within sectoral boundaries to fully understand the environment-economic nexuses within which they are operating. This allows them to design policy based on one set of agreed information which adequately captures the impacts potential policies have on the environment system as a whole rather than sectors in isolation. Integrated information on the environment is therefore an important input to the successful integration of environmental policy. The following sections will discuss the necessary elements needed to integrate environment statistics going forward to respond to policy needs for the post-2015 development agenda.

3.2 Integrating Environmental Economic Statistics in National Statistical Systems

24. Progressively, an integrated economic information system has been established at national and global level based on the System of National Accounts, which serves as a common statistical framework to depict a consistent and coherent picture of economic activity for public and private policy, decision making and other analytical uses. However, environmental-economic statistics has long been lacking an established and common set of information relating humanity and the economy to the environment and its condition. Environmental information tends to be a disparate set of data and a common understanding of the interrelatedness of environmentally related issues with reference to human and economic activity is still under developed. While we have much scientifically based data, it is often discipline specific; based on observations in specific areas; not scalable to national or global level; measured using different methods and definitions; and most often, not presented in reference to economic or human activity.

25. In this regard, the integration of environmental-economic statistics within the national statistical system (i.e. *'horizontal integration'* as coined in section 2.2) concerns the use of common concepts, definitions, estimation methods and data sources for statistical reconciliation across different types of environment and economic statistics (e.g. water, energy and land-use statistics). In order to achieve this, a conceptual organizing framework for environment statistics is needed to ensure; a) consistency in the concepts, definitions and classifications used in different but related fields of environment statistics, and b) data drawn from different sources is numerically consistent. The System of Environmental Economic Accounts (SEEA) was developed to respond to this need and represents the integrated statistical framework to measure the environment and its relationship with the economy and society.

26. In addition to the adoption of a common conceptual framework, integration of environment statistics within the national statistical system requires a systems-wide approach to align the statistical production process for different sectoral statistics, and reconcile institutional arrangements for the production of an integrated information sets. These are necessary and reinforcing elements to facilitate the development of an integrated information system based on the SEEA conceptual framework. The following sections will discuss each in turn.

3.2.1 SEEA: A Conceptual Framework for Integration

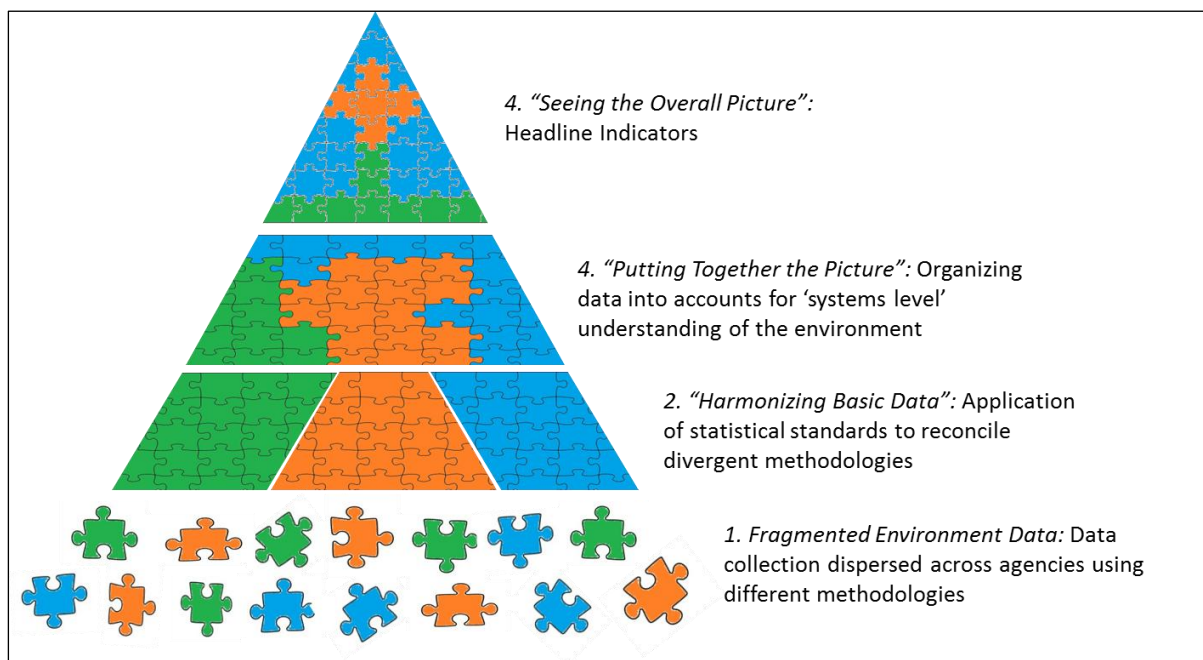
27. The SEEA presents an international standard for the organization of environment and economic statistics into an accounting framework based on the accounting concepts, structures, rules and principles of the System of National Accounts. The SEEA represents a system approach to the organization of statistics, which covers both the state of the environment and its relationship with the economy, including flows of natural inputs from the environment to the economy and flows of residuals from the economy to the environment. By bringing different sectoral statistics together under the SEEA conceptual framework, a sound illustration and assessment of the inter-linkages and trade-offs between different variables and/or sectors is facilitated through methodological alignment of different data sources. Diagram 3 illustrates how the SEEA serves as the conceptual framework to both harmonise and organise environmental data into one integrated information system.

28. As illustrated in level 1 of diagram 3, methodological inconsistencies tend to result when bringing environment and economic data together as data items are collected and compiled by different agencies, which use different methodologies. As a result, data items often exhibit inconsistencies in definitions, classifications, time boundaries and geographical scope, which makes it difficult to compare data (e.g. across sectors, product items, sub-national boundaries, countries etc.) or combine data within one framework. The first step in developing a coherent and integrated picture of the environment is to harmonise this basic environmental data (as depicted by level 2 in Diagram 3). The statistical standard of the SEEA comprises a set of internationally agreed concepts, definitions and classifications. By applying the SEEA to all relevant environmental data collection initiatives, the use of uniform concepts, definitions and classifications ensures the resulting statistics are compatible (i.e. they fit together) such that they can be combined regardless of who is responsible for collecting the basic data.

29. As depicted in level 3 of diagram 2, once basic environment and economic data is harmonised, its organisation into the accounting structure of the SEEA allows for a more systemic understanding of key natural systems, their interlinkages and how they relate to the economy (e.g. the hydrological cycle, agricultural and energy production processes). In particular, environmental asset accounts bring together information on the state of key environmental assets (e.g. water resources, mineral and energy resources, land cover types) and how those assets change over time due to

economic and natural processes. The SEEA Supply and Use tables organise information on environmental flows between the environment and the economy, both in terms of the source and destination of those flows and the responsible economic activity. By bringing this information together under the conceptual umbrella of the SEEA, an integrated understanding of different environmental issues, their interconnections, as well as their links to the economy can be developed.

Diagram 3: The SEEA to Integrate Environment Information



30. It is important to note that because the SEEA uses the same accounting conventions as the SNA, flows of natural inputs and residuals between the environment and economy can be attributed to economic activities and by product type based on classifications common to both statistical standards (e.g. the Standard Industrial Classification of All Economic Activities). This allows for the integration of environment statistics (which are often measured in physical terms) with economic statistics (measured in monetary terms) within one single framework. The accounts therefore facilitate the derivation of key aggregates of environmental flows disaggregated by economic sector as well as important ratio indicators linking environmental and economic flows. Similarly, environmental-economic modelling is facilitated. As illustrated in the paper prepared by UNSD on ‘The SEEA as the Statistical Framework in meeting Data Quality Criteria for SDG Indicators’, indicators derived from integrated statistical frameworks are likely to be of higher quality as the basic statistics used to derive them are calculated using one consistent methodological framework avoiding, for example, inconsistencies in the use of terminology (i.e. definitions of data items) which result in inaccuracies. Furthermore, it is often the case that the calculation of the numerator and denominator of a given indicator, particularly ratio indicators, are not derived in a fully consistent way. They may use different definitions, classifications, time and space boundaries or scientific methodologies. When combined, this can result in an inaccurate and often meaningless indicator. An elaboration of this is provided in Box 3.

3.2.2 SEEA: Institutional Arrangements and Production of Statistics

31. As noted above, integration of environment Statistics requires a solid conceptual framework as a first step, but favourable institutional settings for statistical integration as well as alignment of the components of the statistical production process across different sets of environment statistics is also

needed. The methodological inconsistencies between environment data identified in the above section are mainly caused by the separate and independent statistical operations used by government departments responsible for producing a specific subset of environmental and economic information, resulting in uncoordinated sets of statistics.

32. The adoption of a common internationally agreed methodology (i.e. the SEEA) for the production of national indicators, will allow for the achievement of efficiencies in the statistical production process by creating the scope for the consolidation of these dispersed data collection, processing and dissemination activities. In order to implement the SEEA as a country's accounting framework for the environment, different agencies responsible for collecting the component data must all align to the SEEA standard. Managing the adoption of a common standard and seeking agreement on statistical production and related data exchange and dissemination processes calls for significant buy-in and willingness to participate by multiple agencies, as well as the development of institutional arrangements between the lead statistical agency and other data producing and collecting agencies. Depending on the level of centralisation of the statistical system, the necessary institutional and legal arrangements to facilitate this will vary. However, implementation of the SEEA can trigger the development of such institutional mechanisms which act as a catalyst for consolidation of data activities thereby leading to more efficient and better coordinated statistical systems for the environment.

3.3 Integrating Environment Statistics for the Global Statistical System

33. The following section will discuss the integration of environment and economic statistics from the perspective of the global statistical system (i.e. *vertical integration* as coined in section 2.2) and the corresponding reporting and monitoring landscape which exists between countries and international agencies in the context of the Sustainable Development Agenda. In general, '*vertical integration*' of statistics for SDG monitoring will require three key elements: an architecture of integrated indicators sets for different levels of monitoring; national ownership of data used in international reporting based on integrated national statistical systems; and the development of a consolidated system for reporting on SDGs.

3.3.1 SEEA: Integrated Indicator Architecture for SDGs

34. The global monitoring mechanism for the SDGs is likely to entail reporting at a number of different levels to reflect national reporting constraints and the wide variations in the level of development and policy priorities of countries. To reflect these different needs and constraints, the proposed architecture of the SDG indicator framework will likely consist of different sets of indicators for different levels of reporting as outlined in Box 2.

35. It is important that the three tiers of indicators sets described above are organised within one integrated architecture based on a nesting of indicators. The core global set of indicators is expected to entail higher level indicators, which are more aggregated in nature and capture elements of multiple targets for the purposes of advocacy and communication. It is desirable that a comprehensive and methodological link exists between the global indicators and the more specific indicators measured at national level, to ensure that the policy implications of international monitoring and evaluation do not become detached from national monitoring and evaluation. Due to the interlinkages between SDG targets, including the integration and overlaps in issues identified for measurement, the need for a coherent methodological link between the global indicators used at the international level and national indicators of finer detail is therefore particularly salient.

36. A coherent methodological conceptual framework should therefore exist between different levels of monitoring, which can be facilitated by the use of integrated statistical frameworks such as the SEEA to ensure that the same concepts, definitions and classifications are used at all levels. The concrete example provided in Box 3 serves to illustrate how the SEEA provides the methodological umbrella necessary for a coherent set of nested indicators.

Box 2: Proposed SDG Indicator Architecture

The Architecture for monitoring the SDGs will likely consist of different ‘tiers’ of indicators;

I. *Global Core:* Information will be collected on a global level to inform a limited number of universal indicators to serve as a basis to assess SDG progress across countries and regions. The objective of these indicators is to inform international policy making and provide a basis for communication and advocacy for priority areas of sustainable development. The core global set of indicators should be limited in number for communication purposes and in respect of capacity constraints. Given the inter-linkages and overlaps between SDG targets, global core indicators should inform multiple targets based on conceptual links and overlaps between targets. The core set of global indicators will be used as the basis to develop complementary lists of regional, national and sub-national indicators;

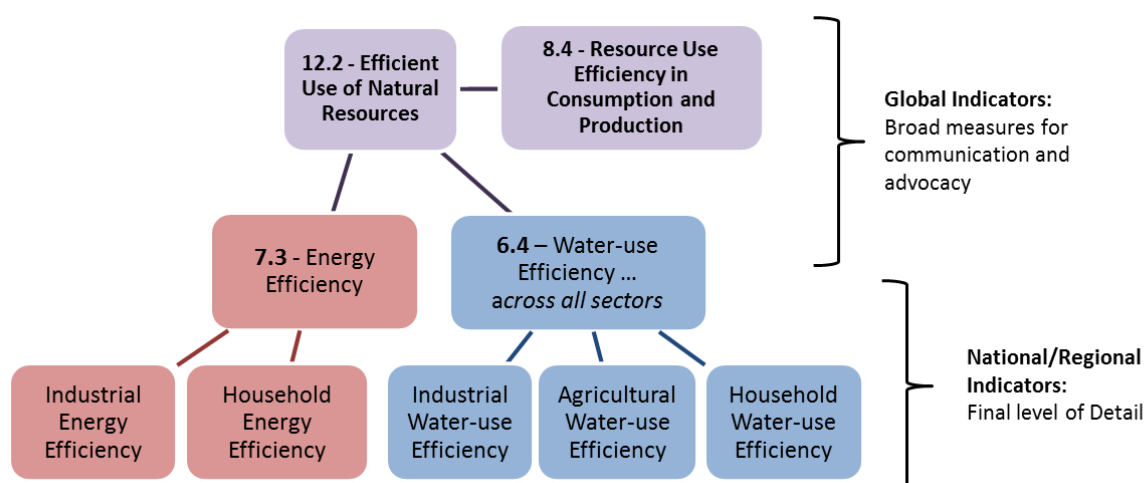
II. *Regional, National and Sub-National Indicators:* These are expected to serve as an extension of the Global Core Set, building on the Core by capturing more detailed aspects of the targets, which are relevant to regional, national and policy decisions. Due to the different starting points and policy focus of countries, these national indicators lists are expected to address specific national policy priorities and will reflect national sustainable policy initiatives. These complementary lists should be nested within the core list of indicators, such that a coherent methodological link exists between the ‘higher-level’ indicator in the global core set and the more detailed indicator in the national set.

III. *Thematic sets of indicators:* These will be established based on topics for which more detailed information is needed. They will be established at all levels of monitoring to cover certain aspects of a target which may not be covered by global and national indicators, but will address specific thematic sustainable development issues in more detail such as sustainable consumption and production, biodiversity, climate changes, etc.

Box 3: Example of the SEEA as the methodological basis for ‘horizontal’ and ‘vertical’ integration of indicators for SDG monitoring

The figure below presents an example of the interlinkages between a set of SDG targets and consequent levels of detail at which the SDGs can be monitored. A number of SDG targets identify efficiency in the use of natural resources, with some targets identifying specific resources such as water and energy. While the global core indicator set may only include one aggregated indicator to measure resource efficiency (i.e. with the aim of capturing improvements in resource efficiency across different resource types within countries in an aggregated way), it is likely that regions and countries may need to calculate resource specific, as well as sector specific, efficiencies for national policy purposes. To ensure comprehensive alignment between the compilation of nationally used figures (e.g. sector efficiencies) and those economy-wide figures which contribute to global resource efficiency indicators, it is important that the indicators used for national and global monitoring are defined in a methodologically coherent way. This is facilitated by ensuring adoption of and compliance with international statistical standards, thereby resulting in the alignment of definitions and classifications. If all indicators in the below example were defined according to the SEEA standard, then the methodology for each indicator would be consistent and countries would be able to compile indicators at the level of detail necessary for policy without making adjustments when reporting national versus international indicators.

Diagram 4: Integrated Indicator Sets for SDGs



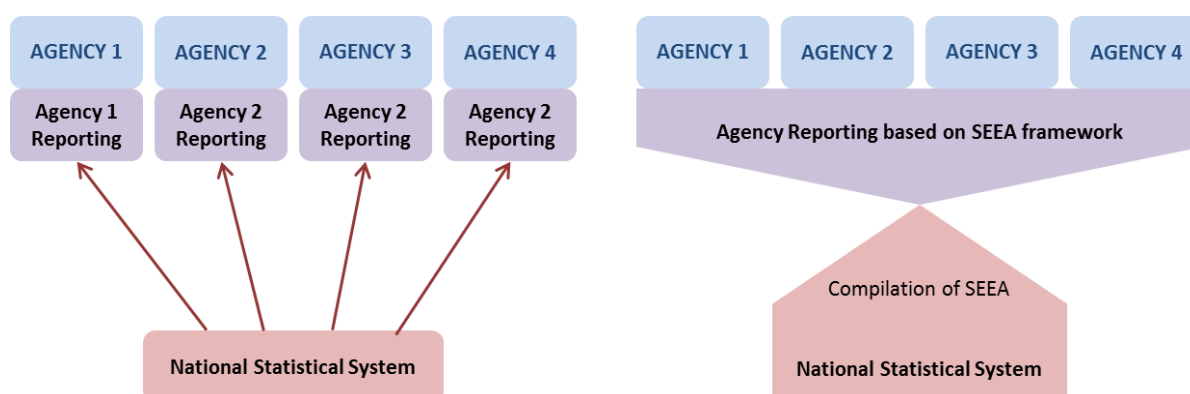
In the current example, the Physical Supply and Use tables for water capture water abstraction and use by industry according to the International Standard Industrial Classification (ISIC). By using the same accounting conventions for water abstraction and use across sectors (i.e. agricultural, industrial and household sectors), these data items from the SEEA can be combined with economic data from the national accounts to calculate efficiency ratios. In addition, compliance with the SEEA means ‘water abstraction’ and/or ‘water-use’ is defined in the same way across sectors, and these sectors are defined by the ISIC. Indicators for water efficiency can therefore be (dis)aggregated in a fully coherent way as the classifications and definitions are the same at all levels of detail. If the SEEA were not used, it is likely that different economic sectors (e.g. agricultural versus industrial) would define ‘water abstraction or use’ in different ways, resulting in inaccuracies when computing “total water abstraction or use”. Furthermore, without applying a standard classification of industries to define “economic sectors” it is likely that some economy activities are omitted from calculation of the indicator while other fall into two categories and are double counted. By horizontally integrating data, the SEEA facilitates streamlined (dis)aggregation of relevant indicators.

3.3.2 SEEA: National Ownership of Data and Consolidation of International Agency Reporting Silos

37. Use of the SEEA as the underpinning statistical framework for relevant SDG indicators offers significant practical advantages in terms of international monitoring and reporting processes. Alignment of the methodologies used at various levels of reporting will facilitate a streamlined reporting process for national statistical offices and other national agencies providing information to inform the core set of global SDG indicators. In particular, use of the same definitions, classifications and spatial units allows for direct transmission of information by countries for international monitoring without countries having to make arduous data adjustments for international comparability.

38. Furthermore, if requests for environmental statistics from international agencies are based on one integrated statistical framework (i.e. the SEEA) then the reporting burden placed on countries for environmental statistics is significantly lower as all the environment statistics countries are requested to compile are derived within one framework, rather than multiple different frameworks each requiring countries to make data adjustments to adhere to individual international agencies' defined methodology. This is depicted in diagram 5. Even if all agencies' reporting systems for all environmental issues for the SDGs are independently sound, if they are not integrated under one statistical framework a common quality assurance framework cannot be established.

Diagram 5: Streamlined Reporting and Lower National Reporting Burdens



39. For countries which currently have low statistical capacity to report nationally measured data for SDG indicators, the consistent use of statistical standards at different levels of monitoring will facilitate a smoother and more efficient transition towards eventual national ownership of SDG indicators over time. Calls for data used in global monitoring to be informed from national statistical systems rather than internationally derived global datasets will need to be met through a process of transition involving significant capacity building at national level. The right hand side of diagram 6 depicts a likely transition process with various threshold steps, through which initial steps entail increased collaboration with, and involvement of national statistical offices in the derivation of modelled estimates to meet data needs. Eventually countries should be in a position to measure SEEA-based indicators at the national level through support and capacity building by the international statistical community. Using the same definitions, classifications and methodologies for environmental data in all phases of the process depicted in Diagram 6 will significantly reduce the hurdles previously encountered when reconciling and communicating nationally compiled statistics with figures estimated at the global level. It will also likely facilitate improved trust, communication

and consistent capacity building among national agencies in the national statistical system and between national and international statisticians.

4. TOWARDS ADOPTING AN SEEA APPROACH

40. The SEEA Central Framework was adopted as a statistical standard in 2012 and many countries have started implementation. In addition, the SEEA Experimental Ecosystem Accounts are being developed, with a number of pilot countries currently in the testing phase to advance the research agenda. The Global Assessment on Environmental Economic Accounting conducted in 2014 indicated that of the 84 countries which responded, 54 had programmes on environmental economic accounts while 15 intend to begin the compilation of accounts in the future. In addition, the OECD and Eurostat have begun data collection on a number of key SEEA accounts (with reporting mandatory in the European Union). In parallel, the joint OECD/Eurostat Questionnaire on the State of the Environment and the joint UNSD/UNEP Questionnaire on Environment Statistics collect data from countries on the environment, which could be further reviewed for its conceptual alignment with the SEEA.

41. Despite recent progress, the SEEA implementation is not adequately advanced for the purposes of SDG monitoring expected to begin in 2016. This recognition is reflected by the request from the UN Statistical Commission at its 46th session that the Committee of Experts on Environmental Accounting should consider ways to scale up the SEEA Implementation programme. While this paper argues for a SEEA-based approach to monitoring SDG indicators in the long run, the lack of immediate SEEA-based data for the 2016 baseline implies the need for a gradual transition to SEEA alignment over time. A short term and long term strategy should be adopted; in the short term, indicators should be derived based on the best available data and where possible aligned with the SEEA, while in the longer term, capacity to report on SEEA-based accounts can be developed for reporting purposes. The following section will discuss the requirements needed to this end, both within the international statistical community, international development agencies and national statistical systems.

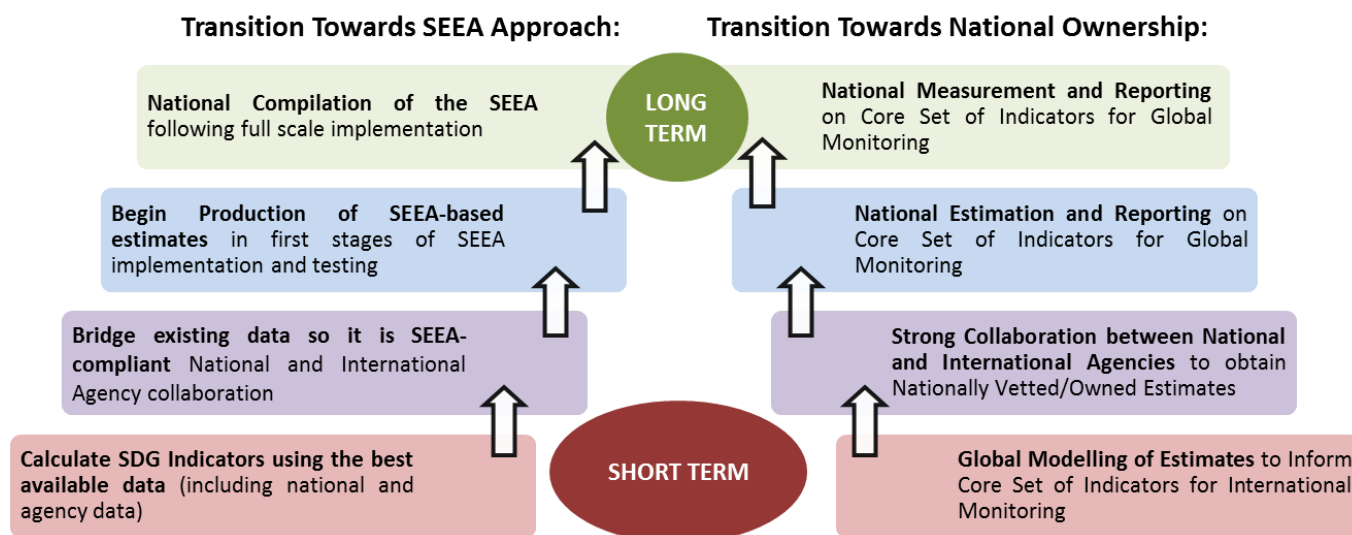
4.1 Adopting a SEEA approach: International Statistical Community and SDG process

42. At its 45th Session in 2014, the Statistical Commission recognized the SEEA as an important statistical framework for the post- 2015 development agenda and the sustainable development goals indicators. Furthermore, it requested at its 46th session in 2015 that the UN Committee of Experts on Environmental Economic Accounting closely collaborate with relevant groups to promote and advocate that SEEA be properly reflected in the formulation of the sustainable development goal indicators. In this regard and as a first step, the relevant SDG indicators developed by the Inter-Agency and Expert Group on SDG Indicators should be defined according to SEEA methodology. This will help to define the parameters for a coordinated transition towards a standards based approach over time. If SDG indicators are not defined in alignment with statistical standards from the outset, it is more likely that international initiatives and national capacity building efforts for SDG reporting will fail to converge to the statistical standard as the incentive to do so is significantly weaker.

43. It is generally not expected that in the short term the data sources available to inform the SDG indicators will be compliant with the SEEA. A process of transition will be needed along the lines suggested in the left hand side of Diagram 6. This process will entail a period of adjusting existing data sources so that they are SEEA compliant; either through the bridging of existing global data-sets,

or through adaptation of country-based questionnaires and collaboration with national experts to make necessary adjustments. This will require the development of bridging tables by relevant international agencies which currently compile global datasets on SEEA-relevant data. As national capacity to compile and report on SEEA-based accounts increases, international data collection for the SEEA can begin. A series of Technical Notes and Core Tables have been developed which aim to present the key SEEA accounts and information needed to inform the SDG indicators. The expectation is that these tables will form the basis of international reporting on the SEEA, and these efforts will take place in full coordination with existing SEEA data collection mechanisms at the OECD and Eurostat.

Diagram 6: Tiered transition towards SEEA-based reporting on nationally-owned SDGs



44. A number of enabling factors are necessary to achieve the long term goal of SEEA-based reporting by countries on SDG indicators. As indicated in Diagram 6, the process of SEEA implementation (particularly in developing countries) will take place in tandem with significant efforts to increase national statistical capacity to secure national ownership of SDG monitoring. The following sections discuss important factors at both the national and international level which will help to ensure these processes take place in a synergistic way.

4.2 Adopting an SEEA Approach: National Reporting

45. Significant investment and capacity building will be needed by national statistical systems with the goal of developing an integrated information system to inform sustainable development. The Implementation Strategy for the SEEA Central Framework, endorsed by the UN Statistical Commission in 2013, provides initial guidance on the implementation of the SEEA as a first step in this process. The objective of the implementation strategy is to assist countries in the adoption of the SEEA Central Framework as the conceptual framework for integrating environment statistics, and to incrementally establish the technical capacity for regular reporting on a minimum set of accounts.

46. In this regard and for the purposes of responding to information needs for SDG reporting, a first step for countries looking to establish an integrated information system is to define the scope of integration. The process of developing an integrated information system will likely be a staged process, starting with a smaller set of priority statistical domains to address the most pressing user demands. Given the wide variation of policy concerns across countries, the SEEA takes a flexible and modular approach to implementation, allowing countries to prioritise compilation of accounts specific

to their policy needs. Countries should therefore make the strategic decision on the scope for integration based on national policy demands and priorities.

47. A key aspect of establishing an integrated information system on the environment is to establish a national institutional mechanism to drive integration. As discussed in previous sections, data collection is fragmented across different national agencies, and harmonisation of that data to the SEEA standard requires sustained commitment from source agencies. Depending on the scope of integration, existing institutional collaborative arrangements should be reviewed and where necessary strengthened with key ministries and agencies leading national steering arrangements, and organised by thematic issues and/or accounts at the level of technical working groups. A flexible structure should be adopted that can be expanded as the domains of integration expand. That said, integration should be consciously introduced in the quality management culture of the national statistical system from the outset, to guide the institutional arrangements being made throughout the process. Furthermore, the approach to integration and corresponding characteristics of the institutional mechanism can be described generically but will depend on the specific structure of the national statistical system.

48. While it is noted that the integration of environment and economic statistics based on the SEEA conceptual framework is a complicated process, which will require significant investment, a number of benefits can be expected in the longer run in the form of more efficient statistical systems, more integrated information to inform integrated policy (as laid out in section 3.1 and 3.2), and an improved capacity to respond to international reporting demands with nationally compiled information (as suggested in section 3.3). This process of implementation should be supported by technical assistance and training from international agencies, as well as north-south and south-south cooperation through the establishment of communities of practice.

4.3 Adopting an SEEA Approach: International Agencies

49. International agencies have a key role to play in supporting the implementation of the SEEA. Buy-in at the highest national and global policy level is required as a first step, to provide the necessary mandate to align statistical frameworks used by agencies with the SEEA standard. A number of policy initiatives have already adopted the SEEA as their underlying statistical framework, including the OECD's Green Growth Strategy, the European Union's Beyond GDP Framework, the World Bank's WAVES initiative and the Convention on Biological Diversity's Aichi Targets. This will facilitate alignment of the reporting requirements placed on countries by these international agencies, with the aim to reduce countries' response burden resulting from involvement in multiple international initiatives.

50. Similarly positive signals have been received from major international policy initiatives such as Sustainable Consumption and Production (SCP) under the 10YFP, monitoring of water related SDG indicators under inter-agency Global Expanded Monitoring Initiatives (GEMI), and the three Rio Conventions on biodiversity, climate change and desertification. The annex to this paper lays out how this process of aligning international reporting initiatives to the SEEA Standard can be facilitated for Sustainable Development Goal 6, taking into account the existing data collection mechanisms and the necessary adjustments needed to align to the Standard. Similar efforts will be undertaken for other goals, including goal 12 on Sustainable Consumption and Production.

51. As mentioned in section 2, the fact that different international agencies have different entry points in countries means that they have a key role to play in promoting implementation of the SEEA,

which requires buy-in and collaboration among a number of different national agencies. Rather than supporting statistical capacity development in countries to respond to individual and time-bound policy frameworks, international agencies should support the combined development of standards based and integrated statistical systems which equip countries with the necessary capacity to respond to information needs as they emerge in a sustainable and flexible manner. In order to achieve this, international agencies should take a coordinated and consistent methodological approach across all technical assistance provided. A first step and key aspect of this is communication, through which agencies use their different entry points in countries to encourage and support national counterparts to support implementation of the SEEA.

52. Given that the SEEA is a relatively new standard, significant capacity building is needed within agencies to align their work with the SEEA. A training-of-trainers for international agencies on specific SEEA-modules relating to their work is therefore required.

5. Concluding Remarks

53. The SDGs represent a step towards closer integration of policy frameworks and programmes, requiring more integrated information on the inter-linkages between the economy, the environment and society. The statistical community has an opportunity to respond to these demands by adopting standards based approach to develop integrated information systems at the national level, supported by a global monitoring mechanism based on the same standards and conceptual frameworks. The systems of national accounting (i.e. the SNA and SEEA) are important statistical frameworks to support this, as their systems approach helps to ensure methodological consistency across sectors and at multiple layers of monitoring. This will help to ensure that the global monitoring architecture for the Sustainable Development Agenda is both comprehensive and builds the necessary monitoring links to reflect the integrated nature of the SDG agenda. The use of a systems approach based on the SEEA and SNA can also significantly streamline the statistical system for global reporting and reduce national response burdens. The alignment of data compilation initiatives to a standards based approach in the national statistics systems results in data being compiled once for multiple purposes within a common interface. When international agencies' reporting initiatives are also standards based, this allows for direct transmission of information from national statistical systems through a common interface to various international reporting initiatives.

54. This paper has presented a transformative roadmap for aligning the monitoring of relevant Sustainable Development Goals with the SEEA standard, taking into consideration national capacity constraints and the need to use and build on existing global reporting efforts. An in depth analysis must now be undertaken for each thematic⁴ area to: 1) assess the potential to align global indicators with the SEEA standard; 2) assess current data availability and monitoring mechanisms at the global level, with a view to developing a standards based monitoring framework which enhances the complementarity of initiatives; and 3) develop national capacity to implement the SEEA and further integrate and modernise statistical production processes.

⁴ For a preliminary example of such work please refer to Annex 1: “Towards Standards-based Global Monitoring for Water”

Questions for Discussion

- 1. Do you agree with the analysis of institutional and statistical transformation of the national and global statistical system needed in support of the sustainable development agenda presented in the paper and how the SEEA can inform this transformative process?*
- 2. Do you agree with the tiered roadmap presented in diagram 6 for aligning the SDG indicators with the SEEA and achieving national ownership of monitoring and reporting SDG indicators?*
- 3. Do you agree with the analysis of the transition to SEEA compliant monitoring reporting on water related SDG indicators presented in Annex 1 and should this analysis be extended to other thematic areas/goals of the SDG framework?*
- 4. How can the UNCEEA promote this SEEA-based approach in the SDG monitoring and reporting process?*

Annex 1: Towards Standards Based Global Monitoring – The Case of Water

The intention is that this annex will eventually analyse for each relevant thematic area the extent and way in which SDG monitoring and reporting mechanisms can be aligned with the SEEA standard. This will involve: 1) an analysis of the global indicators proposed by international organizations to the Inter-Agency and Expert Group on SDGs for each thematic area, and alignment of the definitions and classifications used with the SEEA standard; 2) an assessment of existing global datasets and the extent to which they are aligned and/or can be aligned with the SEEA standard, and; 3) an assessment of the extent to which data sources exist at the national level for the population of the core/minimum set of SEEA accounts needed to inform these indicators

The SEEA-Water was already recognised as an interim standard in 2007, and a large number of countries are already well-advanced with the implementation of SEEA water accounts. The Global Assessment on Environmental-Economic Accounts conducted in 2014 indicated that of the 85 countries which responded, 23 already compile water accounts while a further 28 plan to begin compilation in the near future. For these reasons, water has been chosen as the first thematic area for which this analysis should take place. In addition, efforts are underway to make Sustainable Consumption and Production indicators SEEA compliant, and consultants are engaged to address the abovementioned issues and develop an implementation strategy. A draft Terms of Reference for these SCP consultants is provided on the website of the 10th meeting of the UNCEEA.

With this eventual goal in mind, this annex will start by exploring the importance of developing an integrated information system for water which is based on statistical standards, and as a first step, present preliminary efforts to align SDG indicator proposals with the SEEA standard.

A1. Overview

This paper has argued that basing the SDG indicator framework on statistical standards such as the SEEA and SNA is crucial to ensuring the production of high quality indicators which are internationally comparable and based on international best practice. In addition, by defining the SDG indicator architecture according to standards, methodological consistency is ensured across and between different levels of monitoring. A standards-based approach will also consolidate the system for global reporting and reduce national response burdens. Basing international agencies' reporting initiatives on statistical standards aligns the methodology used by each reporting framework, thereby facilitating more direct transmission of information from National Statistical Systems through a common interface to various international reporting initiatives. As each request for information is based on consistent definitions, classifications and spatial units, the burden on countries to make methodological adjustments is reduced in the long term.

The compilation of statistics and international reporting on water-related issues is a crucial area in which alignment to statistical standards must take place. The structure of the statistical system for water reflects the diversity of issues relating to water both at the national and international level. At the national level, water statistics are dispersed in reflection of the multitude of sectors for which water is a key concern, resulting in a siloed production of data which is difficult to combine to obtain complete and integrated understanding of the hydrological system and its relationship with the economy and societal wellbeing. Similarly, a large number of international organizations operate within the water sector, each with specific thematic concerns and targeted policy frameworks. This has resulted in a number of well-established global reporting mechanisms to address specific policy

concerns, each based on individual methodologies and compiling data on a variety of water related issues.

Attempts to integrate water policy have been widespread at the national level, in particular through the adoption of an integrated water resources management approach and close cooperation between different ministries and groups to ensure coordinated development and management of water, land and related resources, with the goal of maximizing economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. At the international level, a wide range of international organizations work to improve water related issues within specific thematic areas, coordinated under the umbrella of UN-Water which works to strengthen cooperation among all UN agencies working on all aspects of freshwater and sanitation, including surface and groundwater resources, the interface between freshwater and seawater and water-related disasters.

Improvements in the monitoring mechanisms for water are now needed to support these efforts. In this regard, the System of Environmental Economic Accounts for Water presents a statistical framework to harmonize and organise water statistics within an accounting structure. It represents an important tool for countries to build an information system to inform water policy which adequately captures the inter-linkages between sectors competing for water, the societal and economic impacts of competing demands for water, and the impact of the economy on water resources and their quality in the longer term. Furthermore, adoption of the SEEA-Water as the statistical framework for global reporting mechanisms for water in the context of the SDGs would promote methodological consistency across all levels of reporting and between currently incompatible global datasets. Harmonization of the global reporting mechanisms for water in alignment with the SEEA, in combination with national capacity building to compile SEEA accounts for water, would significantly improve the ability of countries to meet monitoring needs for SDG 6.

As mentioned, the SEEA-Water can support a standards-based monitoring framework for water, from which global indicators can be derived from SEEA aligned global reporting mechanisms while at the same time providing methodological scope for countries to compile more detailed and disaggregated indicators depending on policy needs. Achieving this will require a process of transition, based on the following important steps:

- A. *Develop a SDG indicator architecture for water which is aligned with the SEEA*
- B. *Assess existing global data sources and their associated methodologies, and the extent to which these can be used to compile 2016 baselines for indicators defined according to SEEA standards*
- C. *Develop a programme of work to create a global reporting framework for SDG 6 which is aligned with the SEEA*
 - I. *Where reporting mechanisms are in place:*
 - *In the short term, where global datasets are established but not aligned with standards, develop methods to bridge/adapt existing data to calculate baselines in alignment with the SEEA*
 - *In the longer term, develop a joint programme of work with relevant organizations to align established reporting mechanisms with the SEEA standard*
 - II. *When monitoring mechanisms do not exist (and data is not available): develop these mechanisms in line with SEEA standards*

D. Develop a joint programme of work among international organisations to support national capacity to compile water-related information in a sustainable way and in full alignment with the SEEA standard

Significant efforts have already been made by UNSD to complete step A and align the global indicators proposed by UN-Water and other international organizations to the International-Agency and Expert Group on SDGs (IAEG-SDGs) with the SEEA standard. This work is presented in section A3, with the expectation that future work will review and build on this. For the purposes of illustration, the remainder of this annex will provide an overview of the SEEA-Water and the scope of alignment which can take place. It will present a brief explanation of the value of implementing SEEA-Water in countries to support national statistical systems in the development of integrated information on water. It will then present the work done on aligning the global indicators being proposed to the IAEG-SDGs for Goal 6, and provide an overview of the potential of SEEA-Water methodology to disaggregate global indicators at the national level, as well as use the SEEA accounts to derive supplementary national information to monitor and inform specific targets.

A2. Mainstreaming Water in the Integrated Statistical System

Water is an integral component of sustainable development and is critical for socio-economic development, healthy ecosystems, human survival and health. It has been reflected as such in the Sustainable Development Goals, both as a stand-alone goal and an enabler for achieving a number of other Goals. The extent to which water is linked with the sustainable production of energy, food and adaptation to climate change requires an integrated approach to policy decisions based on a full understanding of the hydrological cycle and its relationship with the economy, social well-being and other natural systems. Given the diversity of issues to which water is a primary concern, a siloed approach to water policy often results, in which different sectors compete for scarce water resources and exert negative externalities on other sectors and groups through their use of and impact on the hydrological system.

In reflection, national statistics on water are typically dispersed across multiple responsible ministries and agencies. In particular, agricultural ministries often collect information on water use and emissions of water residuals by the agricultural sector. Water agencies responsible for municipal water supply collect information on the supply of water to households and industries connected to the water grid, both in cities and rural areas, as well as the generation and treatment of sewerage. Information on water use by mining and energy sectors, as well as heavy manufacturing are again likely collected by different ministries. Furthermore, the health of water-related ecosystems and their capacity to provide ecosystem services are typically the domain of environment ministries, and the capacity of water-related ecosystems to provide protection against natural disasters may be monitored by city planning, defence and/or many other national agencies.

To support the development of integrated water policies, this information should be brought together into one system to understand, among other things, patterns of water use and re-use across sectors, flows of water between sectors, how the hydrological system impacts different sectors of the economy, and the extent to which different sectors affect the availability of water resources and the quality of these resources in the short and longer term. In this regard, this section will briefly present the key sets of information needs which are likely to arise in national water policy considerations, based on a brief analysis of what may be considered the four main quadrants of water policy. It will then describe the SEEA-Water accounts and how they can inform these quadrants.

In general, water policy can be grouped into four main quadrants as illustrated in figure 1. These are reflected in the Sustainable Development Goals on Water, which cover a range of targets to address specific components of this broader framework. In view of the information needs identified in figure 1, the SEEA-Water provides a strong conceptual framework to harmonize and bring together the necessary economic and hydrological information relevant to these broad policy areas, based on a number of tables and accounts. In general there are five main accounts which capture various aspects of this system and are described briefly in figure 2.

Figure 1: Policy Quadrants, SDG targets and Corresponding Information Needs

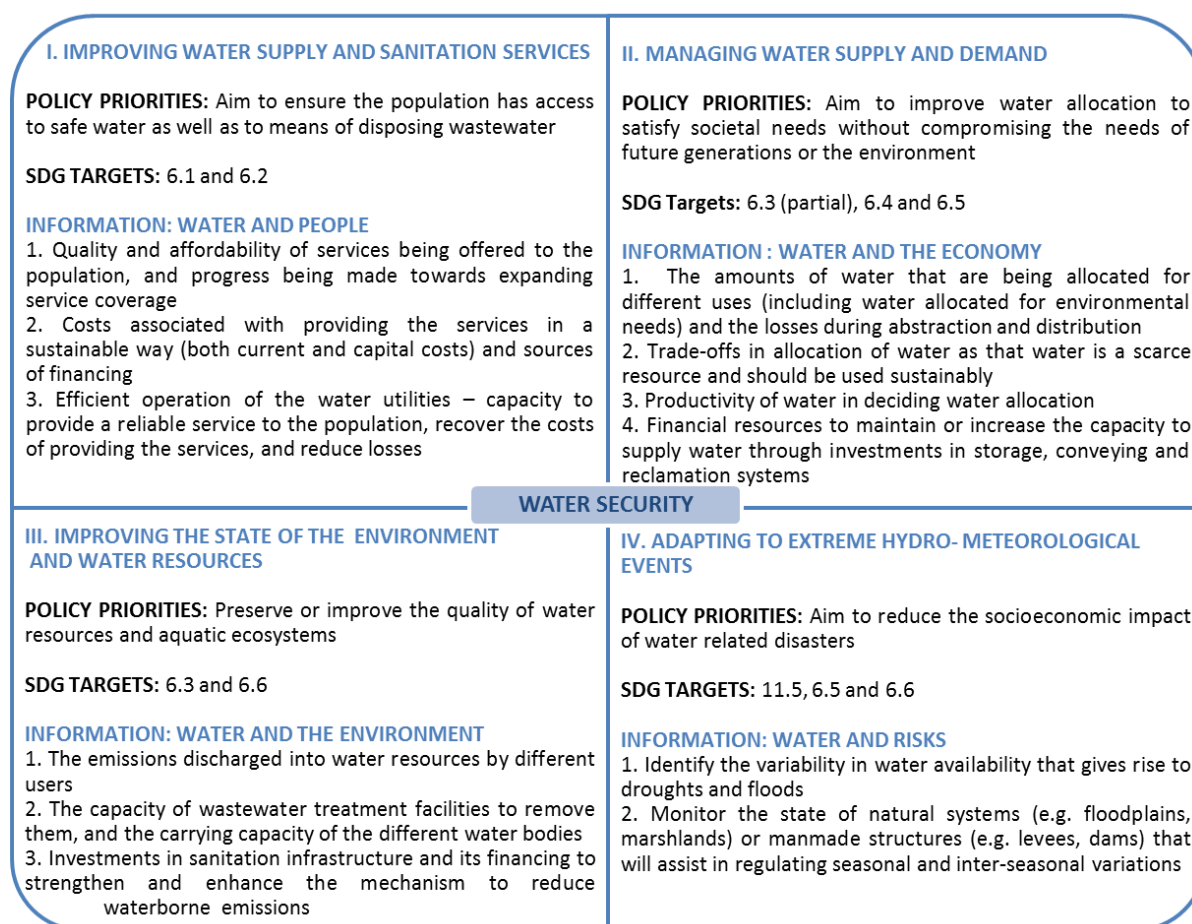


Figure 2: Overview of SEEA-Water Accounts

PHYSICAL SUPPLY AND USE TABLES (PSUT) for water bring together hydrological data on the volume of water used and discharged back into the environment by the economy. They provide information on the volumes of water exchanged between the environment and economy (abstractions and returns) and also within the economy (supply and use within the economy⁵). The physical supply and use tables for water describe three types of flow; a) environment to economy, b) within economy and c) economy to environment. Bringing this information together under the common framework of the SEEA means the information is presented using definitions and classifications of the standard economic accounts of the SNA. **This information is particularly relevant to Policy Quadrants I and II.**

EMISSION ACCOUNTS describe the pressure that the economy puts on the environment in terms of emissions into water. They bring together information on the quantity of pollutants that is added to

⁵ This includes re-used water and waste-water to sewerage

wastewater, as well as the quantity removed as part of treatment by the sewerage industry. **This information is particularly relevant to Policy Quadrants II and III.**

ASSET ACCOUNTS measure stocks of water resource assets in physical terms at the beginning and end of an accounting period, describing all changes in the stock due to both natural and human activities. These accounts help to link water abstraction and returns to water availability in the environment, thereby providing information on economic pressures being exerted on water resources. **This information is particularly relevant to Policy Quadrant II.**

COMBINED PRESENTATIONS⁶ link physical information in the PSUT with emissions information and monetary information on the production (supply) and consumption (use) of water related products. The monetary part of the tables identifies two water-related products; natural water exchanged between economic units and sewerage services⁷. Depending on the issue of interest, combined presentations can provide information on; 1) the costs associated with the production of water-related products; 2) the income generated by their production and 3) the investment in water related infrastructure and costs to maintain that infrastructure. Combining physical and monetary data in a coherent way makes the analysis of trade-offs in alternative water policies and economic strategies possible, and allows for the calculation of important indicators such as water efficiency. **This information is particularly relevant to Quadrants I and II.**

ECONOMIC ACCOUNTS for activities and products related to water include a range of accounts on the costs of water use and supply as well as its financing. The combined presentations described above can be expanded to provide information on the intermediate costs and outputs of water related activities carried out for own-use by households and industries (to fully reflect the contribution of water-related activities to the economy). They can also be expanded to government expenditures for water services such as administration of policy and enforcing standards. Specific economic accounts can also provide information on government instruments used to regulate water in the economy. In addition, national expenditure accounts for water related activities provide information on the expenditure by different economic units within a country on environmental protection and resource management activities related to water. Financing accounts provide information on the financing of this national expenditure by identifying the financing sector and its beneficiaries for these activities. These accounts are useful tool for informing cost-recovery policies and water allocation policies, **making this information relevant to all Policy Quadrants.**

EXPERIMENTAL ECOSYSTEM ACCOUNTS⁸ can provide information on a number of issues relating to water in four contexts; 1) water as an ecosystem asset, 2) water as a characteristic of ecosystem asset condition; 3) the provision of water as an ecosystem service, and 4) water related ecosystem services. These accounts provide much of the biophysical information necessary for tracking changes in extent and condition of water-related ecosystems, as well as for measuring the ecosystem services provided (such as water filtration, regulation or retention). They can be used to identify water-related ecosystems declining in quality, and the economic and other uses dependent on them, and hence allow for the targeting of investment in remediation to achieve the greatest overall benefit. **This information is particularly relevant to policy quadrant III and IV.**

To illustrate how the SEEA-Water accounts can strengthen the global monitoring framework for SDG 6, the following section provides a preliminary illustration of how information in the accounts can be used inform relevant indicators at all levels within one methodologically coherent indicator framework for water.

A3. Developing a Standards-based Indicator Architecture for SDG 6

⁶ Also referred to as Hybrid Accounts

⁷ Including sewerage treatment and septic tank cleaning services

⁸ Experimental Ecosystem Accounts are an extension to the SEEA Central Framework and are still experimental.

As described in box 2, the Indicators Architecture for the SDGs will consist of a number of global indicators for reporting at the international level, complemented by a range of national and thematic indicators which countries may compile based on capacity and depending on their policy priorities. A list of global indicators to monitor SDG 6 on water has been compiled and submitted to the Inter-Agency and Expert Group on SDG Indicators, based on input from multiple agencies and coordinated by UN-Water. Many of these indicators can be directly measured using SEEA-Water methodology, and it is therefore important to ensure that efforts are made to align these indicators to the SEEA standard in the short term.

This section will therefore consider each Global Indicator in turn and provide initial guidance on how this can be defined in alignment with SEEA methodology. To complement this, an illustration of how these global indicators can be disaggregated for national purposes and what types of additional contextual information can be obtained from the SEEA-Water accounts to complement the Global Indicators is described.

Target 6.1 - By 2030, achieve universal and equitable access to safe and affordable drinking water for all

Target 6.2 - By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

Global Indicators proposed by UN-Water

- 6.1.1 Percentage of population using safely managed drinking water services
- 6.2.1 Percentage of population using safely managed sanitation services
- 6.2.2 Population with a hand washing facility with soap and water in the household

Alignment to SEEA: Much of the information required to calculate the proposed indicators goes beyond the scope of the SEEA-Water and requires more detailed household information based on censuses, administrative sources and surveys. While the SEEA-Water accounts do not directly inform these indicators, efforts should be made where relevant and necessary to align definitions and methodologies with the SEEA standard.

Related Information for National Policy: The SEEA-Water accounts can however assist national policy makers to understand the role and contribution of the household sector in the hydrological system, as well as economic information which will impact policy design. Particularly relevant information contained in the accounts includes:

- *Contextual Information in Physical Terms* regarding the amount of water supplied to households and the amount of wastewater generated by them, as well as the relative importance (in physical terms) of households in total consumption of drinking water and generation of sewerage products within the economy. This is provided in the PSUT for water, which also includes relevant information on the efficient operation of the water system, such as losses in distribution, which can significantly affect the capacity of utilities to provide a reliable service to the population.
- *Contextual Information in Monetary Terms* is provided in the combined presentations which present information on the cost and expenditure structure for water and sanitation, including the significance of water related products in industries' output and expenditure on (intermediate and final) consumption of water related products by economic units, particularly households. The

combined presentations record actual final consumption of water related products (both for households and governments), which allows for comparison of expenditures on household consumption of water related products over time, independent of the mechanisms in place to fund that consumption.

- *Information on Fixed Capital Formation* for water supply and sanitation services is included in the combined presentations, to inform policy makers on investments being made to maintain and/or improve infrastructure for water supply and sanitation.
- *Information on national expenditures on water related activities* provides information on expenditure by different economic units (including but not limited to government) on environmental protection activities, available in the Economic Accounts for water.

Furthermore, the UN-Water GLAAS TrackFin initiative is developing a methodology to track finance to the water, sanitation and hygiene sector (WASH) in a coherent and consistent manner so as to inform policy and promote effective financing in meeting development goals in this area. Efforts are being made to make the methodology consistent with the SNA, the SEEA and the SEEA-Water.

Target 6.3 - by 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally

Global Indicator proposed by UN-Water:

6.3.1 Percentage of wastewater safely treated (a composite indicator based on treatment ladders for domestic and industrial waste water)

SEEA-Aligned Global Indicator: The indicator proposed by UN-Water can be made compliant with the SEEA standard and informed by the SEEA accounts.

- *6.3.1 SEEA-Aligned Definition:* Percentage of wastewater that undergoes [Primary/ Secondary/ Tertiary] treatment

The information to inform this indicator can be derived from the Physical Supply and Use Tables (PSUT). This alignment, including detailed definitions and data items, is illustrated in more detail in figure 3 at the back of this annex

National SEEA Indicators on Wastewater: More detailed indicators for national monitoring purposes can also be calculated based on the PSUT, including for example disaggregation of the global indicator by economic activity and for the separate calculation of wastewater treatment rates for households. This is because the PSUT essentially break down flows of water to and from economic units by economic activities⁹, with ISIC divisions 36 (water collection, treatment and supply) and 37 (sewerage) identified separately. These are the key industries for the distribution and treatment of water and wastewater.

- Once water is used by an economic unit and is of no further value to it, then it becomes wastewater. It can then be discharged directly into the environment (recorded as a return flow), supplied to a treatment facility (ISIC 37) and recorded as waste water to sewerage or supplied to another industry for further use and recorded as re-used water. As a result, aggregate indicators

⁹ Using the International Standard Industrial Classification (ISIC)

for re-use of wastewater can also be derived from the accounts as well as disaggregation by economic activity to identify the key sectors and industries driving these averages.

- Incorporation of this physical data into combined presentations means the information can also be linked with corresponding expenditure and investment in the provision of services related to wastewater.

National SEEA Indicators on Emissions: the Water Emissions Accounts can also be used at national level to inform the part of the target relating to release of pollutants and water quality. Emissions accounts describe the flow of pollutants added to wastewater as a result of production and consumption, and emissions flowing into water resources directly or indirectly through the sewerage network;

- The Emissions Accounts report the total amount of a pollutant added to water by an economic unit measured at the point of discharge, disaggregated into the quantity of the pollutant released directly to the environment and the quantity of pollutant released into the sewer system with wastewater.
- Emissions to the sewerage system are then treated, and the remaining emissions from the sewerage industry into the environment are re-allocated to the contributing industry/sector.

The emissions accounts can therefore provide information on the attribution of emissions to different industries/sectors, as well as the structure of those flows (i.e. direct or via sewerage facilities).

Target 6.4 - by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity.

Global Indicators Proposed by UN-Water:

6.4.1 Percentage of change in water use efficiency over time

Sectoral efficiencies, including agriculture, industry, energy, municipal, are aggregated in a single indicator through the use of weighting coefficients proportional to each sector's share of total water withdrawal/ consumption. The unit for efficiency can vary between the sectors, e.g. revenue in dollars for industry, energy production in kWh for energy or in kcal for agriculture.

6.4.2 Percentage of total available water resources used, taking environmental water requirements into account (Level of Water Stress)

Defined as the ratio between total water withdrawals (use) by all sectors and available water resources, taking environmental water requirements (EWR) into account.

SEEA-Aligned Global Indicators: The indicators proposed by UN-Water can be made compliant with the SEEA standard and informed by the SEEA accounts.

- *6.4.1 SEEA-aligned definition:* Water Productivity¹⁰ (defined as GDP / Total Water Use)
- *6.4.2 SEEA-aligned definition:* Water Stress (defined as Total Water Abstraction / Total Actual Renewable Water Resources)

¹⁰ Note: Can also calculate as percentage change

The information to inform this indicator can be derived from the physical supply and use tables and the asset accounts of the SEEA-Water. This alignment, including detailed definitions and data items, is illustrated in more detail in figures 4 and 5 at the back of this annex

National SEEA Indicators: While global indicators may be calculated at the aggregate level, countries can use the accounts for further disaggregation by economic activity as the structure of the physical supply and use tables provide detailed information on water abstraction and use by ISIC category and for households. This information can be easily combined with information on value added from the SNA, as it is based on the same classifications. In particular:

- *Water Productivity can be disaggregated by economic activity according to ISIC, calculated as: Value added by ISIC (from the SNA) / Total water use by ISIC*
- *Water-use Efficiency can also be calculated for households as: Total water use by households / Total population*

Furthermore, detailed information on the sustainability of withdrawals can be derived from the asset accounts which may be useful for national policy decisions beyond the information provided by the global indicator. The asset accounts for water illustrate changes in stocks of inland water resources over an accounting period, attributing these either to human or environmental flows;

- The use of asset accounts over time will provide policy makers with key information on water levels, and the extent to which different types of water stock (i.e. surface water, groundwater and soil water) are being depleted over time.
- The evolution of the changes in stocks, and in particular the extent to which human pressures (in the form of abstractions) are causing reductions in stocks of water can also be monitored using the asset accounts.
- Spatial disaggregation is possible at the basin or regional level using SEEA accounts.

Target 6.5 - By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate

Global Indicator Proposed by UN-Water:

6.5.1 Degree of integrated water resources management (IWRM) implementation (0-100)

The SEEA-Water cannot inform this indicator which will be based on a questionnaire. For this target, SEEA-Water should be considered as a tool that functions in support of IWRM by providing the information system to inform this integrated decision making approach.

Target 6.6: by 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

Global Indicator Proposed by UN-Water:

6.6.1 Change in wetlands extent over time

I.e. % change over time using an existing methodology for data collection and analysis to calculate a global average of change in wetland extent and can be disaggregated geographically and by wetland type - the Ramsar broad definition of "wetland" is used

This indicator cannot be informed by the SEEA Central Framework. Moving forward, as the SEEA Experimental Ecosystem Accounts are advanced, the Ecosystem Unit (EU) described in the SEEA EEA Technical Guidance 2015 will be able to provide a framework for classifying wetland assets. The wetland EU can be tailored to country needs and be linked to condition assessments and wetland ecosystem services. The wetland EU can be adapted to both international (Ramsar) and national systems of wetland classifications.

Supplementary information for Alignment of SDG indicators 6.3.1, 6.3.2 and 6.3.3

Figure 3: Aligning Global Indicator 6.3.1 to SEEA definitions and methodology

SEEA Aligned Indicator	SEEA Definition of Terms	SEEA-Defined Numerator (including IRWS data items)	SEEA-Defined Denominator
<p>6.3.1 Percentage of Wastewater that undergoes [primary/secondary/tertiray] treatment</p> <p><i>Total Wastewater Generated that undergoes [primary/secondary/tertiray] treatment / Total Wastewater Generated</i></p>	<p>Wastewater: Water that is of no further immediate value with regard to the purpose for which it had been used or in the pursuit of which it was produced, because of its quality, quantity or time of occurrence.</p> <p>Treatment Definitions:</p> <p>-- <i>Primary Treatment:</i> A mechanical, physical or chemical process involving settlement of suspended solids or any other process in which the BOD of the incoming water is reduced by at least 20 per cent before discharge and the total suspended solids of the incoming water are reduced by at least 50 per cent</p> <p>-- <i>Secondary treatment:</i> A process, following primary treatment of water and generally involving biological or other treatment with a secondary settlement or other process, that results in a BOD removal of at least 70 per cent and a COD removal of at least 75 per cent.</p> <p>-- <i>Tertiary treatment:</i> A process, following secondary treatment, of removing nitrogen, phosphorous or any other pollutant affecting the quality or a specific use of water, such as microbiological pollution or colour. (For more detail see IRWS)</p>	<p>FOR THE WHOLE ECONOMY:</p> <p>Options for Defining 'Wastewater Safely Treated' (and IRWS data item formula)</p> <p>1. Total return flows after (at least primary/secondary/tertiray) treatment (= H.a.1+H.a.2+H.a.3 or = H.a.2+H.a.3 or = H.a.3)</p> <p>2. Total wastewater sent to sewerage industry (=F.3.1+F.4.1)</p> <p>3. Total return flows of water after treatment by economic unit (= H.a)</p> <p>BY ECONOMIC ACTIVITY:</p> <p><i>Total Wastewater Safely Treated by industry can be defined for each ISIC category in the account - the degree to which economic activity classifications are aggregated depends on national preference / priorities.</i></p> <p>Defining Total Wastewater Safely treated by ISIC (including IRWS data items):</p> <p>-- Wastewater sent to sewerage industry for treatment by each ISIC category (=F.3.1+F.4.1)</p> <p><i>Flows of wastewater to the sewerage industry can be further disaggregated depending on the type of treatment received.</i></p>	<p>FOR THE WHOLE ECONOMY:</p> <p>Options for Defining 'Total Wastewater Generated' (and IRWS data item formula)</p> <p>1. Total Return Flows (= H)</p> <p>2. Total Return Flows - Return Flows from Hydroelectric Power Generation and Cooling Water (= H - H.i - H.v)</p> <p>BY ECONOMIC ACTIVITY:</p> <p><i>Total Wastewater Generated can be defined by each ISIC category in the account - the degree to which economic activity classifications are aggregated depends on national preference / priorities.</i></p> <p>Defining 'Total Wastewater Generated' for each ISIC category (and IRWS data item formula):</p> <p>-- Wastewater to sewerage + Wastewater for Reuse + Return Flows (= F.3 + F.4 + H)</p> <p><i>For specific industries (such as ISIC 35 - Electricity, gas, steam and air conditioning supply) further alterations can be made to exclude certain categories of wastewater (e.g. wastewater from hydroelectric power, which is typically included in the SEEA).</i></p>

Figure 4: Aligning Global Indicator 6.4.1 to SEEA definitions and methodology

	SEEA Aligned Indicator	SEEA Definition of Terms	SEEA-Defined Numerator (including IRWS data items)	SEEA-Defined Denominator
6.4.1	<p>Water Productivity:</p> <p><i>Sectoral: Value Added by ISIC / Total Water Use (by ISIC)</i></p> <p><i>Aggregate: GDP / Total Water Use</i></p> <p>-- Note that Total Water Use can be replaced with 'Total Water Consumption' or 'Total Water Abstraction' depending on policy preference</p>	<p>Water use: Water intake of an economic unit. Water use is the sum of water use within the economy (i.e. one economic unit intaking water received through distribution from another economic unit.) and water directly abstracted from the environment.</p> <p>Water Abstraction: The amount of water that is removed from any source, either permanently or temporarily, in a given period of time for final consumption and production activities. Water used for hydroelectric power generation is also considered to be abstraction.</p> <p>Water Consumption: That part of water use which is not distributed to other economic units and does not return to the environment (to water resources, sea and ocean) because during use it has been incorporated into products, or consumed by households or livestock. It is calculated as the difference between total use and total supply; thus, it may include losses due to evaporation occurring in distribution and apparent losses due to illegal tapping as well as malfunctioning metering. (note also referred to as 'final water use')</p>	<p>FOR THE ECONOMY AS A WHOLE:</p> <p>1. GDP (from the National Accounts)</p> <p>FOR INDIVIDUAL INDUSTRIES</p> <p>1. Value Added for by each economic activity (in the System of National Accounts)</p> <p>Scope for Sectoral Disaggregation: For this indicator, sectoral efficiencies will be calculated for different ISIC categories (i.e. industries) which are then aggregated for the whole economy using the economy totals in the accounts. Development of SEEA accounts for water would mean that Water Use can be attributed by ISIC categories, in the same way that value added is attributed by ISIC categories in the national accounts.</p>	<p>FOR THE ECONOMY AS A WHOLE:</p> <p>Defining 'Water Use/Abstraction/Consumption for the whole economy (and IRWS data items)</p> <p>1. Total Water Use = The Sum of Water Abstraction across economic activities plus water that is received from foreign economic units. (=E + G.2 + G.4)</p> <p>1. Total Water Abstraction = Sum of Abstraction of Water across all economic activities (=E)</p> <p>3. Total Water Consumption = The sum of water consumption by economic activity. (=E + G - F - H)</p> <p>FOR INDIVIDUAL INDUSTRIES</p> <p>Defining 'Water Use/Abstraction/Consumption for each Economic Activity (industries categorised by ISIC)(and IRWS data items)</p> <p>1. Use of Water = Abstracted for Own Use + Water received by Economic Units (=E.a + G)</p> <p>2. Abstraction of Water (=E)</p> <p>3. Water Consumption = Abstraction for Own Use + Water Received by Economic Units - Supply of Water to Other Economic Units - Total Returns (=E.a + G - F - H)</p>

Figure 5: Aligning Global Indicator 6.4.2 to SEEA definitions and methodology

	SEEA Aligned Indicator	SEEA Definition of Terms	SEEA-Defined Numerator (including IRWS data items)	SEEA-Defined Denominator
6.4	<p>Level of Water Stress (also known as water withdrawal intensity):</p> <p><i>Total Abstraction / Total Actual Renewable Water Resources</i></p>	<p>*Internal Renewable Water Resources (IRWR): Average annual flow of rivers and recharge of groundwater generated from endogenous precipitation. (note: can be computed from the matrix of flows between the water resources)</p> <p>*External Renewable Water Resources (ERWR): Part of the country's renewable water resources shared with neighbouring countries. Total external resources are the inflow from neighbouring countries (transboundary groundwater and surface water inflows), and the relevant part of the shared lakes or border rivers.</p> <p>*Total Actual Renewable Water Resources (TARWR): The sum of IRWR and ERWR, taking into consideration the quantity of flow reserved to upstream and downstream countries through formal or informal agreements or treaties and reduction of flow due to upstream withdrawal. It corresponds to the maximum theoretical amount of water actually available for a country at a given moment.</p>	<p>FOR THE WHOLE ECONOMY:</p> <p>1. Abstraction of Water (=E)</p> <p>FOR INDIVIDUAL INDUSTRIES</p> <p><i>The data items suggested can be calculated for each ISIC group to get figures for each industry.</i></p> <p>1. Abstraction of Water (=E)</p>	<p>Defining 'Total Actual Renewable Water Resources'</p> <p>1. Total Actual Renewable Water Resources = [Internal Renewable Water Resources + Actual External Renewable Water Resources] = [external inflows + surface water run-off + groundwater recharge - (overlap + treaty obligations)]</p> <p><i>Where overlap is defined as natural transfers of groundwater to surface water - natural transfers of surface water to groundwater.</i></p> <p><i>= (B.1.a + D.6 + B.2.1 + B.2.2.b - C.2.1.1.a.a - o/p)</i></p>

Data Items needed to define SEEA-aligned SDG indicators 6.3.1, 6.4.1 and 6.4.2

Data Item E. Abstraction of Water: The volume of water that is removed or collected by economic units directly from the environment within the territory of reference, per year.

This data item can be disaggregated along a number of lines:

-----*BY SOURCE:*

E.1 - From Inland Water Resources

E.1.1 - From surface water

E.1.2 - From ground water

E.1.3 - From soil water

E.2 - Collection of Precipitation

E.3 - Abstraction from the sea

----- *BY PURPOSE*

E.a - For own use: The volume of water abstracted and used by the same economic units within the territory of reference, per year.

E.b - For distribution: The volume of water abstracted by an economic unit for the purpose of being supplied to other economic units, often after treatment, within the territory of reference, per year.

Data Item F. Water supplied to Economic Units: The volume of water that is provided by one economic unit to another economic unit through mains, artificial open channels, sewers, drains, trucks or other means, per year. This excludes the losses of water in distribution which are included in data item I and the supply of bottled water (CPC, Ver. 2, 9410), which is one of the supplementary data items.

This can be disaggregated into:

F.1 - Water supplied by resident economic units to resident economic units

F.2 - Water exported to the rest of the world (water exports)

F.3 - Wastewater supplied by resident economic units to resident economic units

F.3.1 - For treatment or Disposal

F.3.2 - For Further Use

F.4 - Wastewater exported to the rest of the world (wastewater exports)

F.4.1 - For treatment or Disposal

F.4.2 - For Further Use

Data Item G. Water Received by Economic Units: The volume of water that is provided by one economic unit to another economic unit through mains, artificial open channels, sewers, drains, trucks or other means, per year. This excludes the losses of water in distribution which are included in data item I and the supply of bottled water

This can be disaggregated into:

G.1 - Water received by resident economic units from resident economic units

G.2 - Water received by resident economic units from the rest of the world (water imports)

G.3 - Wastewater received by resident economic units from resident economic units

G.3.1 - For treatment or Disposal

G.3.2 - For Further Use

G.4 - Wastewater received by resident economy units from the rest of the world (wastewater imports)

- G.4.1 - For treatment or Disposal
- G.4.2 - For Further Use

Data Item H. Returns of Water to the Environment by Economic Units: The volume of water that flows from economic units directly to inland water resources, to the sea or to land, within the territory of reference, per year. This includes urban storm water, losses due to leakage and burst pipes, irrigation water that infiltrates into groundwater or ends up in surface water, and the discharges of cooling water and water used for hydroelectricity generation. It excludes evaporation because evaporation is consumption.

This data item can be disaggregated along a number of ways;

----- *BY DESTINATION*

H.1 - Returns to inland water resources

H.2 - Returns to the sea

H.1 - Returns to land

----- *BY TREATMENT*

H.a - After treatment by economic unit

H.a.1 - After primary treatment

H.a.2 - After secondary treatment

H.a.3 - After tertiary treatment

H.b - Without treatment

----- *BY SOURCE*

H.i - From hydroelectric power generation

H.ii - From irrigation

H.iii - From mining

H.iv - From urban run-off

H.v - From cooling water

H.vi - After being used for other purposes

Data Item B: Inflow of Water to a territory's inland water resources: The volume of water that flows into a territory's inland water resources, consisting of precipitation and inflows from upstream territories, per year.

B.1 – Precipitation

B.2 – Inflow of Water from Neighbouring territories

B.2.1 - Secured through treaties

B.2.2 – Not secured through treaties

Data Item C. Outflow of water from a territory's inland water resources: The volume of water that flows out of a territory's inland water resources, consisting of evapotranspiration from inland water resources and the outflow of surface water and groundwater to downstream territories and the sea, per year. This excludes water and sewage exported since these are flows between economic units and the rest of the world, after being abstracted from the environment.

C.1 - Evapotranspiration from inland water resources

C.2 - Outflow of water to neighbouring territories and the sea

C.2.1 - To neighbouring territories

C.2.2 - To the sea

Data Item D. Natural transfers with other resources in the territory: The volume of water that moves between inland water resources of a territory, per year.

D.1 - From surface water to groundwater

D.2 - From groundwater to surface water

D.3 - Between surface water resources

D.4 - Between ground water resources