DRAFT
Proposed core tables for water

Part I-Introduction

1. The United Nations Statistical Commission at its 44th session in March 2013 adopted the implementation strategy for the System of Environmental-Economic Accounting (SEEA) Central Framework and, among others, urged the United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA) to develop a core set of tables and accounts. One of the areas of the SEEA where there is high demand from countries to compile environmental economic accounts based on policy priorities is water.

2. Water is essential for life. It is a key element in growing food, generating energy, producing many industrial products as well as in ensuring the integrity of ecosystems and the goods and services they provide. Increasing competition for freshwater between agriculture, urban and industrial use as well as population growth results in pressure on water resources, with many countries (or regions within countries) reaching conditions of water scarcity or facing limits to economic development. Moreover, water quality may deteriorate over time further limiting the availability of freshwater resources. Ecosystems and the services they provide could also be adversely affected by the quantity and quality of available water. Because of the integral role that water plays in human life and economic activity, water accounting crosses a number of different types of accounts including physical flow accounts and asset accounts.

3. The proposed core tables for the water aim to provide information to aid policymakers to make informed decision related to the issues mentioned above. They provide both monetary and physical information in a combined presentation. They also include information on physical water flows and assets. As such the core tables give a succinct, policy relevant presentation. The proposed core tables for water build upon the SEEA Central Framework, SEEA Water and the International Recommendations for Water Statistics.

4. The development of core tables was requested by the UN Statistical Commission at its 44th session in February 2013. The core tables for water, along with other core tables such as those for energy, forests, and others, constitute the starting point in the development of common reporting tables in close coordination with international agencies. They will be submitted to the UNCEEA after having gone through extensive consultations with experts, including the London Group on Environmental Accounting, international organizations and national statistical offices.

5. This paper is organized as follows. Part 1 presents the core tables. Part 2 discusses some of the indicators that use information included in the core table and part 3 outlines the basic steps required for the compilation of the core water accounts as presented here, together with a description of the key data sources. Part 4 provides a list of questions for the London Group. The annex lists the data items required to populate the core table.

Part II-Proposed Core Tables for Water

6. The proposed first core table for water is shown below. It combines information on flows in both monetary and physical terms as well as information from the national accounts and labor statistics to present an overview of the water situation in a country. The data items and their definitions are listed in the annex.

Core table 1

	Industries (by ISIC Division)							Rest of the world	Taxes less subsidies on products, trade and transport margins	Actual final consumption		
	ISIC 01-03	ISIC 05-33, 41-43	ISIC 35	ISIC 36	ISIC 37	ISIC 38,39, 45-99	Total industry			Households	Government	Total
Supply of water products (Currency units)												
Natural water	L.1.1	L.1.1	L.1.1	L.1.1	L.1.1	L.1.1	L.1.1		M.1.1.1-[N.1.1.1+N.1.2.1]			L.1.1+M.1.1.1-[N.1.1.1+N.1.2.1]
Sewerage services	L.1.2	L.1.2	L.1.2	L.1.2	L.1.2	L.1.2	L.1.2		M.1.1.2-[N.1.1.2+N.1.2.2]			L.1.2+M.1.1.2-[N.1.1.2+N.1.2.2]
Total supply of products												
Intermediate consumption and final use (Currency units)												
Natural water	L.4.1	L.4.1	L.4.1	L.4.1	L.4.1	L.4.1	L.4.1			N.1.1.1+N.1.2.1	N.1.1.1+N.1.2.1	L.4.1+N.1.1.1+N.1.2.1
Sewerage services	L.5.1	L.5.1	L.5.1	L.5.1	L.5.1	L.5.1	L.5.1			N.1.1.2+N.1.2.2	N.1.1.2+N.1.2.2	L.5.1+N.1.1.2+N.1.2.2
Other products												
Gross value added (Currency units)												
Employment												
Use of water (Millions m3)												
Total Abstraction	E	E	E	E	E	E	E			E		E
of which: Abstraction for own use	E.a	E.a	E.a	E.a	E.a	E.a	E.a			E.a		E.a
Use of water received from other economic units	G	G	G	G	G	G	G	F.2+F.4		G		G+F.2+F.4
of which: Wastewater	G.3	G.3	G.3	G.3	G.3	G.3	G.3					
Supply of water (Millions m3)												
Supply of water to other economic units	F	F	F	F	F	F	F	G.2+G.4				F+G2+G4
of which: Wastewater	F.3	F.3	F.3	F.3	F.3	F.3	F.3					
Total returns	H	H	H	H	H	H	H			H		H
Water consumption (Millions m3)												
Gross fixed capital formation (Currency units)												
For water supply	P.1.1	P.1.1	P.1.1	P.1.1	P.1.1	P.1.1	P.1.1					P.1.1
For water sanitation	P.1.2	P.1.2	P.1.2	P.1.2	P.1.2	P.1.2	P.1.2					P.1.2
Closing Stocks of fixed assets for water supply (Currency units)	O.1.1	O.1.1	O.1.1	O.1.1	O.1.1	O.1.1	O.1.1					O.1.1
Closing Stocks of fixed assets for water sanitation (Currency units)	O.1.2	O.1.2	O.1.2	O.1.2	O.1.2	O.1.2	O.1.2					O.1.2

7. Within water accounting, the interest lies in linking the abstraction and use of water in physical terms with estimates of output and value added by industry and the total final consumption of households. The presentation of physical and monetary information in the same account allows for the derivation of consistent indicators for evaluating the impact on water resources of changes in the economy due, for example, to changes in economic structure. Using combined accounts in economic models permits the analysis of possible trade-offs between alternative water policies and economic strategies. (The potential links to economic models are described further in SEEA Applications and Extensions.)

8. For the monetary part of table, two water-related products are identified: natural water and sewerage services. Depending on data availability, other products may be incorporated, for example those relating to irrigation water. The monetary part also includes estimates of total supply of products (i.e., including the output of non-water products) for each industry, thus providing an indication of the relative significance of the output of water-related products as part of total industry output.

9. The physical flows in the table reflect volumes of water supplied between economic units, as well as total returns to the environment. The bulk of the supply of water appears in the columns corresponding to the Water collection, treatment and supply industry and the Sewerage industry (ISIC 35). If flows relating to hydropower are significance within the total physical flows of water, they could be shown explicitly as an "of which" column within ISIC 35. It should be noted that "Water consumption" is referred to as such in SEEA-Water, while SEEA Central Framework uses the term "Final Water Use" instead.

10. It is useful to incorporate in the monetary part of the combined table, estimates of gross fixed capital formation (investment) for water supply and treatment operations. These entries are made for each relevant industry in additional rows in the table.

11. The building blocks for the first core table can be found in the physical and monetary supply and use tables for water, the national accounts and labor statistics. These tables[1] provide more details that the core table and should be populated to the extent possible as part of the process of compiling the core table.

12. As the discussion above suggests, the first core table can be conceptualized as being derived from 3 smaller tables which when combined given a broad overview of the water situation in a country. These 3 tables are shown in turn below. Countries could focus on one of these particular tables depending on their policy priorities and data availability. Furthermore each of these smaller tables contains sufficient information in and of themselves to derive a number of useful aggregates and indicators as is discussed in Part 2. Should countries be interested in a more detailed presentation of information, the data can be further disaggregated; in particular data could be presented at the ISIC group level (3 digits) for certain ISIC divisions as needed and/or additional data item could be added to the rows of the tables to provide a finer level of details. For example, if the generation of electric power through hydropower plants is important, data on water use by hydropower plants corresponding to ISIC 351 can be presented as an "of which" column within ISIC 35. Furthermore, ISIC 36 can be

[1] SEEA Central Framework table 3.6 (table 3.5.1 of the white cover version)

separate into two columns: one for drinking water (i.e. water that is distributed through a distribution network of main lines) and one that includes all other forms. Similarly, the supply of water in physical terms could be expanded with additional data items showing, for example, sources of abstracted water.

13. It should be noted that while the tables contain data items for most cells in the table, in practice countries can focus on only those data items that are significant. For many countries, it will be the case that most entries will not be significant and populating the table will not require having entries for all cells. Also certain data items such as actual final consumption of households (N.1.1.1+N.1.1.2) can be difficult to obtain from the national accounts. In such cases countries should initially focus on completing the table to the extent possible given their constraints.

Table 1.1 Simplified supply and use table in physical terms

Physical supply table for water

	Abstraction of water; Production of water; Generation of return flows							Flows from the rest of the world	Flows from the environment	Total supply
	ISIC 01-03	ISIC 05-33, 41-43	ISIC 35	ISIC 36	ISIC 37	ISIC 38,39, 45-99	Households	Imports		
Sources of abstracted water										
Total supply abstracted water										
Abstracted water										
For distribution										
For own-use										
Wastewater and reused water										
Wastewater										
Reused water produced										
Return flows of water										
Total Return flows										
Evaporation of abstracted water, transpiration and water incorporated into products										
Total										
Total supply										

Physical use table for water

	Abstraction of water; Intermediate consumption; Return flows						Final consumption	Accumulation	Flows to the rest of the world	Flows to the environment	Total use
	ISIC 01-03	ISIC 05-33, 41-43	ISIC 35	ISIC 36	ISIC 37	ISIC 38,39, 45-99	Households		Exports		
Sources of abstracted water											
Total use abstracted water											
Abstracted water											
Distributed water											
Own use											
Wastewater and reused water											
Wastewater											
Reused water											
Return flows of water											
Total return flows											
Evaporation of abstracted water, transpiration and water incorporated into products											
Total											
Total use											

Note that this table will be populated with data items in future revisions as there are outstanding terminology issues between the supply and use table in Chapter 3 and the combined presentation in Chapter 6 of SEEA Central Framework

Table 1.2 Table on supply and use of water in monetary terms and intermediate consumption

	Industries (by ISIC Division)							Rest of the world	Taxes less subsidies on products, trade and transport margins	Actual final		Capital Formation	Total
	ISIC 01-03	ISIC 05-33, 41-43	ISIC 35	ISIC 36	ISIC 37	ISIC 38,39, 45-99	Total industry			Households	Government		
Supply table													
Supply of water products (Currency units)													
Natural water	L.1.1	L.1.1	L.1.1	L.1.1	L.1.1	L.1.1	L.1.1		M.1.1.1-[N.1.1.1+N.1.2.1]				L.1.1+M.1.1.1-[N.1.1.1+N.1.2.1]
Sewerage services	L.1.2	L.1.2	L.1.2	L.1.2	L.1.2	L.1.2	L.1.2		M.1.1.2-[N.1.1.2+N.1.2.2]				L.1.2+M.1.1.2-[N.1.1.2+N.1.2.2]
Use table													
Intermediate consumption and final use (Currency units)													
Natural water	L.4.1	L.4.1	L.4.1	L.4.1	L.4.1	L.4.1	L.4.1			N.1.1.1+N.1.2.1	N.1.1.1+N.1.2.1		L.4.1+N.1.1.1+N.1.2.1
Sewerage services	L.5.1	L.5.1	L.5.1	L.5.1	L.5.1	L.5.1	L.5.1			N.1.1.2+N.1.2.2	N.1.1.2+N.1.2.2		L.5.1+N.1.1.2+N.1.2.2
Water related capital formation												From national accounts	

Table 1.3 Part of core table on capital formation and fixed assets by ISIC

	Industries (by ISIC Division)							Rest of the world	Taxes less subsidies on products, trade and transport margins	Actual final consumption		Total
	ISIC 01-03	ISIC 05-33, 41-43	ISIC 35	ISIC 36	ISIC 37	ISIC 38,39, 45-99	Total industry			Households	Government	
Gross fixed capital formation (Currency units)												
For water supply	P.1.1	P.1.1	P.1.1	P.1.1	P.1.1	P.1.1	P.1.1					P.1.1
For water sanitation	P.1.2	P.1.2	P.1.2	P.1.2	P.1.2	P.1.2	P.1.2					P.1.2
Closing Stocks of fixed assets for water supply (Currency units)	O.1.1	O.1.1	O.1.1	O.1.1	O.1.1	O.1.1	O.1.1					O.1.1
Closing Stocks of fixed assets for water sanitation (Currency units)	O.1.2	O.1.2	O.1.2	O.1.2	O.1.2	O.1.2	O.1.2					O.1.2

14. The second core table contains information on physical flows of water. Asset accounts for water resources focus on the inflows and outflows of water to and from the land surface and subsurface, and on the destination of these flows. The SEEA Central Framework and SEEA Water provide an extensive description of the relevant accounting entries.

15. The accounts then record the flows of water as it is abstracted, consumed, increased through precipitation, or changed through flows to and from other countries and returns to the sea. Note that water precipitation over land is included in soil water. As with the first core table, in many countries only a few of the entries will be of importance. Countries should prioritize based on policy demands and data availability.

Core table 2

	Type of water resource						Total
	Surface water				Groundwater	Soil water	
	Artificial	Lakes	Rivers	Glaciers, snow and ice			
Additions to stock							
Returns	H.1.1.1	H.1.1.2	H.1.1.3	H.1.1.4	H.1.2		H
Precipitation	B.1	B.1	B.1	B.1		B.1	B.1
Inflows from other territories	B.2.1	B.2.1	B.2.1	B.2.1	B.2.1		B.2.1
Inflows from other inland water resources							D
Discoveries of water in aquifers							
Reductions in stock							
Abstraction	E.1.1.1	E.1.1.2	E.1.1.3	E.1.1.5	E.1.2	E.1.3	E
for hydro power generation							E.a.a
for cooling water							E.a.e
Evaporation & actual evapotranspiration	C.1	C.1	C.1	C.1		C.1	C.1
Outflows to other territores			C.2.1	C.2.1	C.2.1		C.2.1
Outflows to the sea			C.2.2	C.2.2	C.2.2		C.2.2
Outflows to other inland water resources							D
Changes in stocks							

Part III-Indicators

16. The information in the core table for water is necessary for the derivation of many key indicators for the water sector. A partial list is included below.

- Total renewable water resources (TRWR) -- Total resources that are offered by the average annual inflow and runoff that feed each hydrosystem (catchment area or aquifer) and 'available' = B.1 - C.1 + C.2 where C.2=C.2.1+C.2.2

- Intensity of use of water resources -- Percentage of TRWR that is used (sum of total withdrawals / abstraction) = E.1 /(B.1 - C.1 + C.2)

- Total abstractions by industry = E.1 disaggregated by industry as shown in core table 1 and table 1.1

- Water productivity indicators (defined as value added by economic activity per cubic metres of water used) can be derived directly from the first core table. In particular: Change in water productivity in agriculture -- Crude proxy: value of agricultural production divided by the volume of water abstracted for agriculture (does not take into account the use of rainfall). = Gross Value Added (agriculture) /[E.1 (agriculture)+ G(agriculture)]

  A similar approach can be taken for other industries. In particular water productivity = Gross Value Added (industry) / [E.1(industry) + G(industry)]. Furthermore water intensity indicators can also be derived using the same information; they are simply the reciprocal of water productivity indicators.

- Importance of investment in water measures the overall gross capital formation for water supply and water sanitation = P.1.1+P.1.2. Dividing this quantity by economy wide gross capital formation and tracking it from year to year gives an indication of the relative importance of investment in water supply and water sanitation assets.

Part IV- Compilation of water accounts

Basic steps

17. This section outlines some basic steps that are relevant in the compilation of water accounts. Both the SEEA Water and the International Recommendations for Water Statistics (IRWS) provide more complete guidance on the organisation of basic data and the preparation of accounts.

18. Following the decision to produce water accounts and the allocation of resources for this, a general process for the compilation of water accounts may be followed. This is described below in nine steps noting, however, the components are not strictly sequential and some may be completed concurrently and it may be necessary to revisit certain steps through the compilation process. The nine steps are:

    i. Define the accounts of interest, the desired geographical scope, the frequency of reporting (e.g. 3 yearly, annual, quarterly), the temporal basis (e.g. financial year, calendar year, hydrological year) and the desired level of industry and household detail.
    ii. Identify potential data sources and assess their suitability for accounts relative to the design choices made in Step 1. In this step the metadata associated with the data sources should be closely examined. Potential sources of data for water accounts are listed below.
    iii. Secure access to data, including the data themselves, associated metadata and the rights to disseminate the accounts that are derived from that data.
    iv. Import data and prepare data for analysis noting that concordances may be required between the classifications used in the imported data (which should be articulated in the metadata associated with the important data) and the classifications to be used in the SEEA based accounts.
    v. Analyse data, including data quality, to identify data gaps, coherence between data sources, etc.; and make required adjustments for scope, definition, timing, classification as appropriate.
    vi. Prepare and edit draft accounts and tables including undertaking an analysis of time series where possible and recognising the likely need for multiple iterations in this step.
    vii. Disseminate accounts, including material to assist interpretation such as indicators, methodological notes and statements of data quality.
    viii. Archive data and related methodological and other documentation.
    ix. Review accounts, data sources, methods and systems, including actively seeking user feedback.

Main data sources

19. The compilation of accounts necessarily requires the integration of data from a wide range of sources. Following is a list of the most common sources of information for water accounting but since the national statistical and information systems of all countries can vary considerably it should be recognised that there is no ideal data source for particular accounting components. The appropriateness of particular data sources should be determined on the basis of the degree of alignment between the scope, timing, and classification of the source data and the target concept as articulated in the SEEA.

20. The most common sources of information include:
    - Survey data: Data from surveys of enterprises, households are likely to be important in determining patterns of use of water. Targeted surveys of some industries, for example, agriculture, may be relevant depending on output requirements. Often the supply and treatment of water will be managed by a limited number of enterprises and hence surveys (or complete enumeration) of these enterprises on their activities (including abstraction, distribution and treatment) may be important data sources.
    - Administrative data: It may be that the operation of water supply and treatment generates various administrative data set, for example, on readings from water meters. With appropriate privacy considerations such administrative data sets may be considered.
    - Hydrological / meteorological data: These data are likely to provide the main information for the measurement of stocks and changes in stocks of water resources. Through direct measurement or the use of scientific models data from these sources will provide measurement of, among other things, surface and groundwater levels, river flows, precipitation, evapotranspiration, and natural transfers between water bodies.
    - Economic / national accounts data: Data from the national accounts and related economic surveys will provide the basis for generating combined presentations and for comparing physical flows of water (as recorded in the PSUT for water) with corresponding measures of economic activity. As well, the national accounts can provide information on transactions associated with the abstraction, distribution and treatment of water include payments for water rights, water prices, costs of production and levels of investment and capital stock.
    - Social data: Relevant social data include employment and population data. These are commonly obtained through household surveys of the labour force, and through population censuses and associated demographic statistics.

Main measurement challenges

21. As with all accounting work there are a range of measurement challenges centred on aligning the available data with the conceptual definitions and scope required for coherent accounts. For water accounting some particular challenges include:
    - Aligning data spatially where physical stock and flow information may be available at a river basin or catchment level while economic data are only available at a national or administrative region level.
    - Accounting for losses of water during abstraction and distribution and the flows of water lost through theft.
    - The recording of household activity, particularly in countries where abstraction of water for own use is prevalent.

Part V- Extensions and links

TBC-- This section will describe ways in which the core accounts might be sensibly extended through additional industry or product detail, geo-spatial extensions, links to social aspects – e.g. by household type.

This section will also note links to other accounts not covered in this technical note. Issues of harmonization with basic environment statistics will be covered as well.

Part VI- References

TBC

Annex-Data items and definitions

The annex provides some of the data items and corresponding definitions required for compiling the core tables for water.[2]

1. Supply of water products (currency units)

L.1.1 -- Natural water -- The value of charges for water and water supply service charges supplied by economic units engaged in water supply activities, either as a principal or a secondary activity, per year.

L.1.2 -- Sewerage services -- The value of sales of sewerage services provided by economic units engaged in sewerage service activities, per year. This includes all charges for the supply of sewerage services.

3. Intermediate consumption and final use (currency units)

L.4 -- Natural water -- The value of water received by users (economic units) supplied by other economic units, per year. This includes the cost of the water plus associated delivery charges.

L.5 -- Sewerage services -- The value of sewerage services received by establishments and households that have been supplied by other economic units, typically from the sewerage industry, per year. For example, the cost of water supply may be the price (e.g., $ per m3) of water multiplied by the volume (m3) used, plus any associated service charges for water supply.

6. Supply of water (Million m3)

F -- Supply of water to other 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 and the supply of bottled water.

H -- Total returns -- 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.

[2] Data items and definitions come from the International Recommendations for Water Statistics.

7. Use of water

E -- Total abstraction -- The volume of water that is removed or collected by economic units directly from the environment within the territory of reference, per year.

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

G -- Use of water received from other economic units -- The volume of water that has been delivered from one economic unit to another economic unit through mains, artificial open channels, sewers, drains, trucks or other means, per year. Water received from other economic units excludes water abstracted directly from the environment and bottled water.

8. Gross fixed capital formation (Currency units)

P.1.1 -- For water supply -- The value of expenditure on the water supply infrastructure used by economic units for water collection, treatment or supply, per year. This is called gross capital formation in SNA. It includes expenditure on the acquisition of pumps, pipes, dams, buildings, vehicles, drilling rigs and land.

P.1.2 -- For water sanitation -- The value of expenditure on fixed assets used to collect, treat and dispose of wastewater, including urban run-off, per year. This includes expenditure used to buy wastewater treatment plants, sewers, pumps, septic tanks, sewerage meters, buildings, drains to collect and transport urban water run-off and land.

9. Closing Stocks of fixed assets for water supply (Currency units) – O.1.1--The value of infrastructure used to abstract, manage, store, treat, distribute, pump and apply water, owned by resident units, at a point in time. This includes artificial reservoirs, pipes, pumps, water tanks, sprinkler systems, water meters, buildings and land, owned and used for these activities. It includes water infrastructure owned by the water supply industry, agriculture, electricity generation, other industries and households.

10. Closing Stocks of fixed assets for water sanitation (Currency units) – O.1.2-- The value of infrastructure used to collect, treat, store, distribute and discharge wastewater, owned by resident units, at a point in time. This includes wastewater treatment plants, sewers, pumps, septic tanks, sewerage meters, buildings and the land, owned and used for these activities. It includes infrastructure owned by the sewerage industry, as well as agriculture, other industries and households, used for the collection of sewage and disposal of water. Included is the value of urban run-off infrastructure, e.g., drains, culverts, pumps, pipes, infiltration facilities, buildings and land, owned and used for the collection, treatment and discharge of urban run-off.

Precipitation – B.1--The volume of water that flows from the atmosphere to inland water resources via rain, snow, sleet, hail, dew, mist, etc., per year.

Inflows from other territories – B.2.1-- The volume of surface water and groundwater that moves into a territory of reference from other territories, or along its border, that is protected by formal agreements with upstream territories, per year.

Inflows from other inland water resources – D -- The volume of water that moves between inland water resources of a territory, per year.

Evaporation & actual evapotranspiration -- C.1 -- The volume of water from land and water surfaces that enters the atmosphere by vaporization of water into a gas and through evaporation and transpiration from plants, per year.

Outflows to other territories – C.2.1-- The volume of surface water and groundwater that flows from within a territory to another territory or territories, per year. This includes water flowing out of artificial reservoirs, lakes, rivers or aquifers that lie along the territory's border.

Outflows to the sea – C.2.2-- The volume of surface water and groundwater that moves from a territory's inland water resources into sea(s) and ocean(s), per year.

Outflows to other inland water resources -- D -- The volume of water that moves between inland water resources of a territory, per year.