

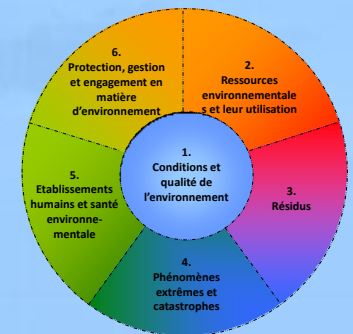


# Boîte à outils du CDSE 2013

## Outil 1: Manuel sur l'Ensemble de Statistiques de Base de l'Environnement (ESBE)

**Atelier sur les statistiques de l'environnement en appui à la mise en  
œuvre du Cadre pour le Développement des Statistiques de  
l'Environnement (CDSE 2013)  
(Lomé, Togo, 19-23 octobre 2015)**

Section des statistiques de l'environnement, Division des statistiques des  
Nations Unies





## Outil 1: Le Manuel sur l'Ensemble de Statistiques de Base de l'Environnement

- ❖ Ce que c'est; son audience
- ❖ La méthode de travail
- ❖ Le modèle des fiches méthodologiques
- ❖ Ce que nous avons fait et appris jusqu'à maintenant
- ❖ Exemples



# Le Manuel sur l'Ensemble de Statistiques de Base de l'Environnement



## Quoi ?

- ❖ Le manuel fournira des orientations méthodologiques pour les pays en développement en ce qui concerne la collecte et la compilation de données environnementales et leur transformation en statistiques
- ❖ Le manuel sera un guide pratique et détaillé pour chacun des thèmes de l'Ensemble de Base, y compris les définitions de variables, la description des sources et de la collecte des données, les méthodes de compilation/traitement des données pour la production de statistiques de l'environnement, les méthodes de dissémination et d'autres informations. Le manuel comprendra des boîtes, diagrammes et des exemples de bonnes pratiques.
- ❖ Il sera composé d'une série de fiches méthodologiques.
- ❖ Les fiches méthodologiques se concentreront donc sur les méthodes statistiques à utiliser pour la collecte et la compilation des statistiques de l'environnement. Elles faciliteront l'utilisation de ces méthodes par tous les fournisseurs de données environnementales.



# Le Manuel sur l'Ensemble de Statistiques de Base de l'Environnement



## Pour qui?

- ❖ Des praticiens travaillant dans des programmes de statistiques de l'environnement ou dans des secteurs spécifiques des statistiques de l'environnement. Ils peuvent travailler pour des INS, Ministères de l'Environnement ou d'autres ministères pertinents aux niveaux national ou sous-national. Ce manuel peut aussi servir des organismes régionaux ou sous régionaux travaillant ou planifiant de travailler sur la production et la dissémination de statistiques de l'environnement.
- ❖ Le public cible principal du manuel est constitué de statisticiens environnementaux et des spécialistes de l'environnement travaillant sur l'analyse de données et le reporting.



# Schéma proposé du manuel



## Introduction

- ❖ Présente les objectifs principaux et l'audience du manuel et décrit brièvement comment il peut être utilisé.

## Les Ensembles de Base du CDSE 2013

- ❖ Décrit ce qu'est l'Ensemble de Base, quels sont ses objectifs principaux et comment il a été construit et structuré selon le CDSE 2013.
- ❖ Décrit comment l'Ensemble de Base peut être adapté et complété selon les priorités, disponibilités des données et plans de développement de chaque pays.

## Fiches de méthodologies et de métadonnées pour les statistiques de l'Ensemble de Base

- ❖ Brève introduction sur la façon dont le modèle fonctionne, une description des champs, et son organisation.
- ❖ Collection des fiches méthodologiques suivant le modèle (voir plus loin).

## Exemples de bonnes pratiques

- ❖ Une sélection de pratiques nationales utilisées pour la collecte / compilation des statistiques de l'environnement.



# Concept du manuel

## Objectif

Elaborer un ensemble de fiches méthodologiques et de métadonnées à l'appui de la collecte/compilation des variables incluses dans l'Ensemble de Statistiques de Base de l'Environnement contenu dans le CDSE 2013. (c'est-à-dire: les définitions, les classifications, les attributs les plus importants, les sources de données, les méthodes de collecte de données, etc.).

## Méthode

Ce travail est coordonné par la DSNU et est réalisé de façon collaborative avec le Groupe d'Experts en Statistiques de l'Environnement (GESE) et, si nécessaire, d'autres experts thématiques d'institutions spécialisées, le tout en utilisant un modèle commun.



# Concept du manuel

## Période 2014-2017

L'objectif est de compléter la première série de fiches méthodologiques ou de métadonnées pour l'EBSE d'ici la fin 2015. Les fiches méthodologiques qui seront prêtes seront disséminées à travers le site internet de la DSNU au fur et à mesure de leur disponibilité:

[http://unstats.un.org/unsd/environment/FDES/Manual\\_BSES.htm](http://unstats.un.org/unsd/environment/FDES/Manual_BSES.htm)

## Partenaires

La Section des statistiques de l'environnement de la DSNU, les membres du GESE et, si nécessaire, des experts d'autres institutions spécialisées.



# Plan de travail

## 1. Préparation

Cette étape comprend les travaux préparatoires à être effectués par la DSNU, y compris les tâches suivantes:

- ❖ Préparer le programme de travail, le modèle de métadonnées
- ❖ Echanger avec les experts
- ❖ Répartir le travail entre les experts

## 2. Elaboration des fiches de méthodologies/métadonnées provisoires

- ❖ Elaboration des fiches de méthodologies/métadonnées (remplissage de tous les champs du modèle) pour les sujets/statistiques par les experts responsables: DSNU, GESE, autres experts d'agences spécialisées si nécessaire.

## 3. Révision et finalisation

- ❖ L'examen par des pairs des ébauches des fiches méthodologiques sera effectué sur une base continue au fur et à mesure que les ébauches deviennent disponibles. A la fois des experts nationaux et internationaux seront appelés à examiner les fiches de méthodologies/métadonnées soumises avant leur finalisation.

## 4. Dissémination

- ❖ Les fiches méthodologiques, une fois finalisées, seront diffusées sur une page web.





## **Processus actuel de développement des fiches méthodologiques**

- ❖ Développer, le cas échéant, les variables de regroupement des fiches méthodologiques au niveau des sujets ou sous-composantes, y compris les niveaux de statistiques 1-3, dans une seule fiche méthodologique.
- ❖ Actuellement en travail sur 13 fiches méthodologiques: ressources en eau, qualité de l'eau douce, déchets, ressources en énergie, minéraux, couverture du sol / utilisation du sol, biodiversité, dépenses de protection de l'environnement, établissements humains, ressources en forêts et en bois, qualité de l'air, cultures agricoles et bétail, émissions de GES, phénomènes naturels extrêmes et catastrophes naturelles.



# Modèle de fiche méthodologique

## FDES 2013 Methodological Manual on the Basic and Core Sets of Environment Statistics

### Template of Methodology Sheets (as of 21 April, 2014)

*[As discussed in the EGES meeting, the general contents of each of the fields of this template are illustrated in the example for Waste, please refer to it. Additional suggestions are presented in red between brackets]*

Code and location in the FDES 2013			
Component	Sub-Component	Topic	Code and Environment Statistic

*[In general, where there is more than one option (i.e. for definitions, sources, international recommendations and classifications), they can all be referenced and/or described providing the source, usefulness, and value added by each choice; but whenever possible, these methodology sheets should make a choice and recommend one of the options, since it is important to provide proper guidance to countries]*

#### 1. Introduction/ Relevance

*[Please explain the context and the importance of the cluster of statistics described in this methodology sheet. When appropriate, mention the environmental international agreement and convention relating to the statistics. When important, please identify and explain why the methodology sheet does not include some statistics that someone would expect to be included in this topic/sub-component]*

#### 2. Definitions and description of the statistics

*[Whenever possible, provide internationally agreed/accepted definitions, otherwise describe the statistics to the extent possible]*

##### 2A. Definition of the statistics

*[please list the definitions of statistics preceded by its FDES code and present the Core Set statistics in bold]*

#### 3. International sources and recommendations

*[In general, whenever possible, link should be made to specific chapters/sections of the referenced documents. When the international environmental agreements and convention provide methods/ classifications to produce the statistics, please make reference to them.]*

##### 3A. Classifications and groupings

*[Please refer to all relevant statistical classifications and commonly used groupings for the statistics of this methodology sheet, include relevant groupings and taxonomies originated in scientific or policy arenas. Please include non- environmental but relevant classifications such as ISIC (see chapter 1.6 and Annex D of the FDES), explain the value of each and which one is recommended and for what purpose.]*

##### 3B. Reference to international statistical recommendations, frameworks and standards

*[Please refer to all relevant statistical recommendations, frameworks and standards for the statistics of this methodology sheet, explain the value of each and its applicability to the statistics contained in this sheet.]*

##### 3C. Sources of global and regional environment statistics and indicators series

*[Please refer to all relevant sources of data, statistics and indicators series containing the statistics of this methodology sheet, explain the value of each and when possible what regions/countries are included and for what period of time]*

#### 4. Transforming data into environment statistics

##### 4A. Data collection and sources of data

*[Please describe how primary data are produced, the usual source type, the institutional partners, the general availability of data sets and quality issues. Please use FDES source typology, i.g. Censuses and Sample Surveys, Administrative Records, Monitoring Systems, Remote Sensing, Scientific Research, and combination of the foregoing methods]*

Source type  
Institutional partners  
Availability of data  
Data quality  
Temporal and Spatial considerations

##### 4B. Data compilation (procedures and instruments) and transformation into environment statistics series

*[Please describe the methods for compiling the data and transforming them into environment statistics mentioning procedures, instruments, aggregation/disaggregation, validation, structuring, and description in metadata, that are commonly used/recommended to produce environment statistics series]*  
*[When appropriate, use decision trees and provide examples and good practices to illustrate]*

Processing of data into statistics  
Statistical unit  
Measurement category and unit  
Statistical population  
Validation  
Periodicity and seasonal variations  
Aggregation/disaggregation  
Metadata

#### 5. Uses and dissemination

##### 5A. Potential presentation/dissemination formats

*[please provide examples of tables, charts or map from countries or links to them, to illustrate potential formats for dissemination]*

##### 5B. Commonly used indicators that incorporate this statistic

*[please provide a list of the commonly used indicators and specify how this statistics feeds into its calculation]*

##### 5C. SEEA accounts/tables that use this statistic

*[when applicable, identify the SEEA Central Framework account and when possible table that use this statistic]*



## Structure du modèle

Code et emplacement dans le CDSE 2013			
Composante	Sous-composante	Sujet	Codes et dénominations de la statistique de l'environnement

### 1. Introduction/Pertinence

### 2. Définitions et description des statistiques

#### 2A. Définition des statistiques

### 3. Sources internationales et recommandations

#### 3A. Classifications et groupements

#### 3B. Référence à des recommandations, cadres et normes internationales

#### 3C. Sources de statistiques de l'environnement et de séries d'indicateurs mondiales et régionales

### 4. Transformation des données en statistiques de l'environnement

#### 4A. Collecte et sources des données

Type de source, partenaires institutionnels, disponibilité des données, qualité des données, considérations spatiales et temporelles

#### 4B. Compilation des données (procédures et instruments) et leur transformation en séries de statistiques de l'environnement

Transformation des données en statistiques, unité statistique, unité de mesure, population statistique, validation, périodicité et variations saisonnières, agrégation / désagrégation, métadonnées

### 5. Utilisations et dissémination

#### 5A. Formats de présentation / dissémination potentielles

#### 5B. Indicateurs couramment utilisés intégrant cette statistique

#### 5C. Comptes / tableaux SCEE utilisant cette statistique



# Exemples: Déchets, Ressources en énergie

Methodological Manual  
Core Set / Basic Set of Environment Statistics  
FDES 2013

Draft Methodological Sheets  
Example "WASTE"

Waste		
Component	Sub-Component	Code and location in the FDES 2013
3. Residuals	3.3 Generation and Management of Waste	Environment Statistic Codes
		3.3.1 Generation of waste
		3.3.1.g Amount of waste generated by economic activity
		3.3.1.b Amount of waste generated by waste category
		3.3.1.c Amount of hazardous waste generated
		3.3.2 Management of waste
		3.3.2.a Municipal waste
		3.3.2.a.1 Total municipal waste collected
		3.3.2.a.2 Amount of municipal waste treated by type of treatment
		3.3.2.a.3 Number of municipal waste treatment and disposal facilities
		3.3.2.a.4 Capacity of municipal waste treatment and disposal facilities
		3.3.2.b Hazardous waste
		3.3.2.b.1 Total hazardous waste collected
		3.3.2.b.2 Amount of hazardous waste treated by type of treatment
		3.3.2.b.3 Number of hazardous waste treatment and disposal facilities
		3.3.2.b.4 Capacity of hazardous waste treatment and disposal facilities
		3.3.2.c Other/industrial waste
		3.3.2.c.1 Total other/industrial waste collected
		3.3.2.c.2 Amount of other/industrial waste treated by type of treatment
		3.3.2.c.3 Number of other/industrial waste treatment and disposal facilities
		3.3.2.c.4 Capacity of industrial waste treatment and disposal facilities
		3.3.2.d Amount of recycled waste
		3.3.2.e Imports of waste
		3.3.2.f Exports of waste
		3.3.2.g Imports of hazardous waste
		3.3.2.h Exports of hazardous waste

## 1. Introduction

Environment statistics on **Waste** provide important information to policymakers to support the protection of the environment, which may be compromised by waste generation and treatment. Understanding the quantity of waste generated and, importantly, whether the waste is hazardous or not, is required to plan for present and future waste management, in terms of transportation and treatment facilities required. More importantly, waste can also be a resource when recycled or used as a fuel source.

Statistics on waste **generation** and **management** allow for the preparation of environmental impact assessments and are useful in developing strategies to encourage waste prevention, reduction, reuse and recycling. Statistics on **municipal waste**, already produced by many countries for many years, allow for the monitoring of household consumption patterns and management practices by municipalities.

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FDES 2013 Methodological Manual on the Basic and Core Sets of Environment Statistics

## Methodology Sheet for 2.2 Energy Resources

UNSD Draft Oct 8 2014

Code and location in the FDES 2013			
Component	Sub-Component	Topic	Code and Environment Statistic
2. Environmental Resources and their Use	2.2 Energy Resources	2.2.1 Stocks and changes of energy resources	a. Energy resources
			<ol style="list-style-type: none"> <li>1. <b>Stocks of commercially recoverable resources</b></li> <li>2. New discoveries</li> <li>3. <i>Upward reappraisals</i></li> <li>4. <i>Upward reclassifications</i></li> <li>5. <b>Extraction</b></li> <li>6. <i>Catastrophic losses</i></li> <li>7. <i>Downward reappraisals</i></li> <li>8. <i>Downward reclassifications</i></li> <li>9. Stocks of potentially commercially recoverable resources</li> <li>10. <i>Stocks of non-commercial and other known resources</i></li> <li>11. <b>Imports of energy minerals</b></li> <li>12. <b>Exports of energy minerals</b></li> </ol>
		2.2.2 Production and consumption of energy from non-renewable and renewable sources	<ol style="list-style-type: none"> <li>a. Production of energy from non-renewable and renewable sources               <ol style="list-style-type: none"> <li>1. <b>Total</b></li> <li>2. <b>Non-renewable sources</b></li> <li>3. <b>Renewable sources</b></li> </ol> </li> <li>b. Production of energy               <ol style="list-style-type: none"> <li>1. <b>Primary energy production</b></li> <li>2. <b>Secondary energy production</b></li> </ol> </li> <li>c. <b>Total consumption of energy</b></li> <li>d. Electric energy               <ol style="list-style-type: none"> <li>1. <b>Electricity production</b></li> <li>2. <b>Installed capacities</b></li> </ol> </li> </ol>

(BSES legend: Bold Text - Core Set/Tier 1; Regular Text - Tier 2; *Italicized Text* - Tier 3)

## 1. Introduction/ Relevance

Energy resources and their use are **key** to development and also to sustainability. Energy is indispensable to all ecosystems and is a necessary input for human controlled processes. In physical terms, energy is always being transformed, from "available energy" to "unavailable energy" (e.g., burning of hydrocarbons) and conversion from an "unusable" to a "usable" form (e.g., hydropower to electricity). Energy, unlike all other natural resources, is not a material substance but instead is the capacity of a physical system to perform work.

For statistical purposes, energy is measured in its "usable form" embedded in energy products. Although physically speaking there would be no such thing as "energy production" or "energy consumption", in statistics these terms refer to the extraction/manufacturing and use of energy products, respectively.

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ork and thus to make them comparable and compatible. (UNFC 2009)  
Total initial resources in a country include the produced, the remaining  
ties of the resource remaining in place:

quantities + remaining recoverable quantities + additional quantities

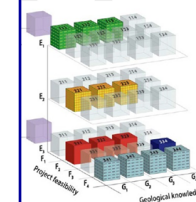
resources initially in-place is constant. In inventories, material balance  
appears, this must be explained by a re-evaluation. (ECE 2009)

and energy resources by looking at whether, and to what extent,  
ration of the resources have been confirmed, developed or planned.  
the underlying resources are classified. The UNFC-2009 is based on a  
to three criteria affecting their extraction:

(E)  
ability (F)

favourability of economic and social conditions in establishing the  
erion F designates the maturity of studies and commitments necessary  
pment projects, extending from early exploration efforts occurring  
posit or accumulation exists, to projects involving extraction and sale of  
level of certainty of geologic knowledge and of potential recoverability  
d.<sup>104</sup>

UNFC-2009 categories and sub-categories<sup>11</sup>



UNFC Definition of Categories and Sub-categories<sup>12</sup>

<sup>11</sup> UN, EC, FAO, IMF, OECD and WB (2014). *System of Environmental-Economic Accounting 2012: Central Framework*, page 161. Available from [http://unstats.un.org/unsd/en/accouting/seea/Rev/SEEA\\_CF\\_Final\\_en.pdf](http://unstats.un.org/unsd/en/accouting/seea/Rev/SEEA_CF_Final_en.pdf)

<sup>12</sup> United Nations, Economic Commission for Europe (2010). *United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009*. Available from [http://www.unecp.org/files/annex/BAM/energy/ie-y-4fr-UNFC-unfc2009-UNFC-2009\\_E319\\_e.pdf](http://www.unecp.org/files/annex/BAM/energy/ie-y-4fr-UNFC-unfc2009-UNFC-2009_E319_e.pdf)

<sup>13</sup> *Ibid.*, Annex I and Annex II



# Exemples: Ressources en eau

Water Resources			
Code and location in the FDES 2013			
Component	Sub-Component	Topic	Environment Statistic Code
2. Environmental Resources and their Use	2.6 Water Resources	2.6.1 Water resources	2.6.1.g Inflow of water to inland water resources
			2.6.1.a.1 Precipitation (also in 1.1.1.b)
			2.6.1.a.2 Inflow from neighbouring countries
			2.6.1.b 0 resource
			2.6.1.b.1
			2.6.1.b.2
			2.6.1.b.3
			2.6.1.b.4
			2.6.1.c In reservoir
			2.6.1.c.1
			2.6.1.c.2
			2.6.1.c.3 streams
			2.6.1.c.4
			2.6.1.c.5 glaciers
		2.6.1.c.6	
		2.6.1.c.7	
		2.6.2 Abstraction, use and returns of water	2.6.2.a Tr
			2.6.2.b W
			2.6.2.c W resource
			2.6.2.c.1
			2.6.2.c.2 resource
			2.6.2.d V
			2.6.2.e V
			2.6.2.f De
2.6.2.g Ri			
2.6.2.h W			
2.6.2.i R			
2.6.2.j W			
2.6.2.k Lc			
2.6.2.l Ex			
2.6.2.m //			
2.6.2.n R			

## 1. Introduction

Management of water resources, in terms of quantities, distribution : priorities in the world today. Environment statistics on water resource needed by policy makers for a number of reasons, which include: resources; monitoring abstraction from key water bodies to prevent or abstracted water; and tracking the volume of water returned to the

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## 2. Definitions and description of the variables and related important terms

Several international agencies, among the UNSD, FAO, Eurostat, OECD, have developed their own definitions over time. In most cases they describe the same phenomena, but there might be some important differences of which producers and users of water statistics have to be aware of.

The International Recommendations for Water Statistics (IRWS) were developed by UNSD as a reference document for water statistics and water accounting. The drafting process of IRWS involved the major international agencies dealing with water statistics and water accounts. Therefore, IRWS is used as a main reference document for the following terms and definitions. Other definitions are taken from the UNSD/UNEP water questionnaire, the OECD/Eurostat Joint Questionnaire on Inland Waters and SEEA-Water.

### 2A. Definition of important terms

**Fresh surface water:** *Water which flows over, or rests on the surface of a land mass, natural watercourses such as rivers, streams, brooks, lakes, etc., as well as artificial watercourses such as irrigation, industrial and navigation canals, drainage systems and artificial reservoirs, bank filtration (induced infiltration of river water through bankside gravel strata (by pumping from wells sunk into the gravel strata to create a hydraulic gradient) with the intention of improving the water quality) is included under (fresh) surface water.* [Source: OECD/Eurostat, Data Collection Manual for the Joint Questionnaire on Inland Waters]

### Fresh groundwater:

Water which is being held in, and can usually be recovered from, or via, an underground formation. All permanent and temporary deposits of water, both artificially charged and naturally, in the subsol, of sufficient quality for at least seasonal use. This category includes phreatic water-bearing strata, as well as deep strata under pressure or not, contained in porous or fracture soils. Groundwater includes springs, both concentrated and diffused, which may be subaqueous.

[Source: OECD/Eurostat, Data Collection Manual for the Joint Questionnaire on Inland Waters]

Notes: Freshwater is usually defined by a relative low salinity (expressed as conductivity or concentration of dissolved substances). If inland waters (surface waters or groundwater) contain a higher concentration of salts they are referred to as "saline water", which could be for example salt lakes, saline lakes or saline aquifers. Internationally often used is a threshold value of 1,000 mg/litres dissolved substances to distinguish between freshwater and saline water. However, different national threshold values are used.

### 2B. Definition of the statistics (core set statistics in bold)

#### 2.6.1 Topic: Water resources

Notes:

- Main data source is usually the national hydrometeorological institute or water administrations.
- Information on water resources may not be available for a calendar year (or month if further temporally disaggregated). Instead some countries use a "hydrological year" for their water balances which is not necessarily identical with the calendar year. If this is the case check whether data can be re-calculated for calendar years. Otherwise provide meta-information about the hydrological year (beginning and end).
- Water resources information is requested in terms of volume (usually million m<sup>3</sup> per year).
- In cases where no annual statistics on water resources are available there might be LTAA (long-term annual average) statistics available. If this is the case provide additionally the meta-information about the time-period (often 30 years averages are used).

#### 2.6.1.a Inflow of water to inland water resources:

Inflow of water to a territory's inland water resources consists of precipitation and inflows from neighbouring territories. [Source: UNSD, International recommendations for Water Statistics - IRWS, Annex I, page 135]

Notes:

- Inflow excludes water and sewage imported from the rest of the world by resident economic units.

**2.6.1.a.1 Precipitation:** The volume of water that flows from the atmosphere to inland water resources via rain, snow, sleet, hail, dew, mist, etc., per year. [Source: UNSD, International recommendations for Water Statistics - IRWS, Annex I, page 135, page 150]

Notes:

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## Statistical unit

The statistical units of the environment are the parts of the environment about which information is collected and statistics are compiled. In the case of water in the environment, these units are the inland water resources or water bodies (the areas or spaces that contain the water).

For the purposes of IRWS, the statistical units of the environment for inland waters are classified as surface water bodies (including artificial reservoirs) and aquifers, with a number of divisions below these levels. For example, a river may be divided into stretches or segments and a large lake may be divided into parts.

Information may be collected and compiled regarding river basins or sub-basins (for example, resident population, land cover, land use or economic activities in these areas) and therefore such river basins and sub-basins may constitute statistical units. Water is also contained in soils and although they are also part of water resources, it is not necessary to include soil as a statistical unit for the purposes of water statistics.

It is essential to understand and define the statistical units of the economy as they interact with water. The economy abstracts water from the environment. Water is exchanged and used within the economy and discharged into the environment. The statistical units of the economy about which information is sought (e.g., how much water they abstract from the environment) and from which this information may be collected (e.g., via survey) are the establishments and households. These are referred to as economic units in IRWS (e.g., in the definition of data items). Economic units are units which can also report information about environment units.

[Source: UNSD, International recommendations for Water Statistics - IRWS]

[Source: UNSD, Statistical Units (2007)]

## Reporting unit

The reporting unit is the unit of the economy that reports information about the statistical unit. For example, a lake can be a statistical unit but any information about the lake will have to be reported by a unit of the economy that owns, manages or monitors the lake or any part thereof. Reporting units are public and private enterprises and establishments, or parts of thereof, and municipalities that abstract and/or use water. [Source: UNSD, International recommendations for Water Statistics - IRWS]

## Measurement unit

In water statistics the measurement unit for water volumes is cubic metres (m<sup>3</sup>), except for the waterborne emissions, which use measures of mass (grams, kilograms, tonnes) or measured physical properties (e.g., chemical oxygen demand (COD)) of emissions. For the collection of primary data, other units of measure may also be used, such as units typically used by farmers to measure abstraction, but for the purposes of presenting data and for comparison, it is important to convert data into standard scientific measurement units (i.e., the metric system). A list of measurement units and conversion factors is provided in Annex VI of the UNSD, International recommendations for Water Statistics - IRWS

## Validation

After collection of primary data from informants, or compiling these data sets from an existing primary source, the environmental statistician would need to perform the usual statistical validation and description procedures. In addition, some degree of aggregation and disaggregation of the statistics will be necessary depending on the information objectives of such statistical operations.

Examples of good validation practices are:

### Check of expected order of magnitude

For most of the data items a certain order of magnitude can be expected. For example water use by households is directly linked with the number of population in a country. Assuming a range of water use between roughly 100 l/capita/day and 500 l/capita/day an expected band-width could be identified. Another example is the calculation of precipitation in terms of height (mm) by dividing the precipitation volume by the concerned area. The resulting figure can be compared with average precipitation data as provided on websites or other publications of national meteorological services. National averages between 50 mm/year (extremely dry countries, such as Egypt) up to about 3,500 mm/year (in tropical countries such as Costa Rica) are realistic. Annual average figures can be found on the website of the World Bank: <http://data.worldbank.org/indicator/AG.LND.PRC.PM>

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