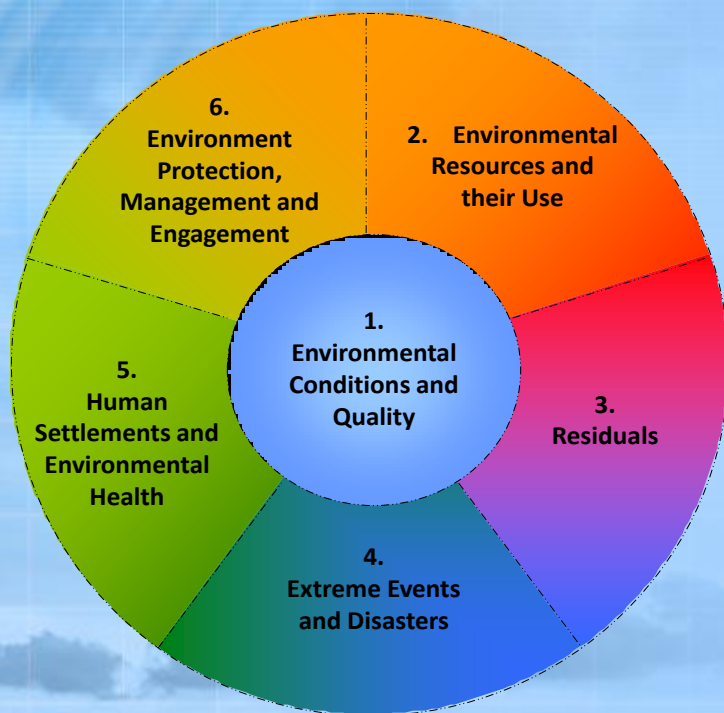
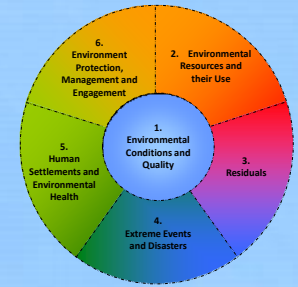


# Components, sub-components and statistical topics of the FDES 2013

## Component 3: Residuals



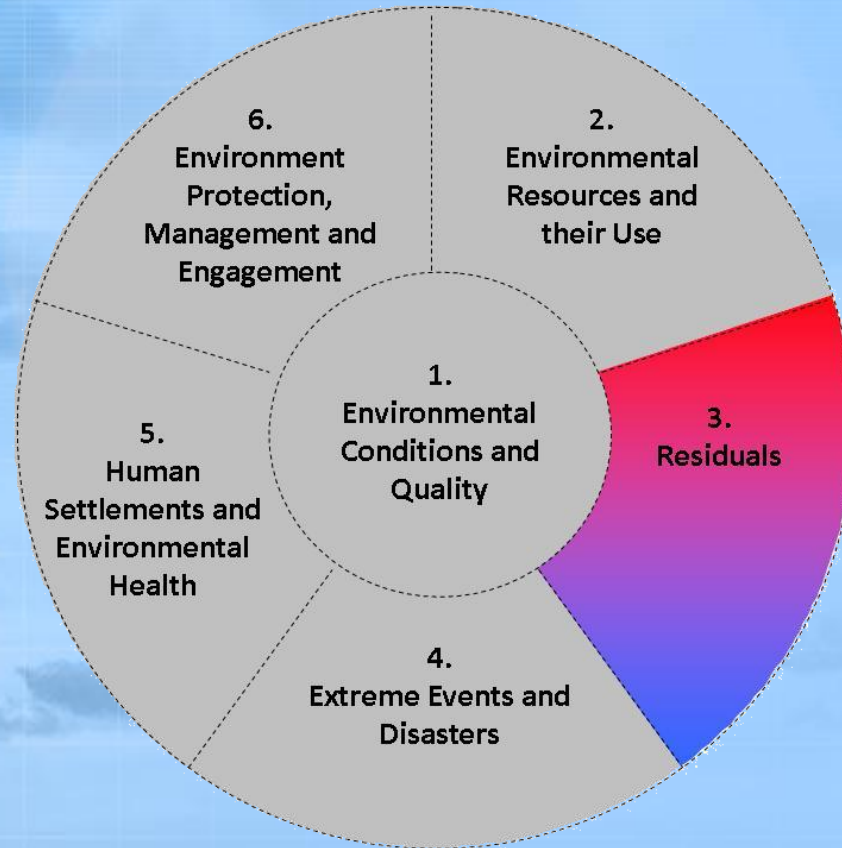
**Workshop on Environment Statistics in support of the implementation of the Framework for the Development of Environment Statistics (FDES 2013) (Calodyne, Mauritius, 26-29 January 2015)**



- This presentation has been elaborated by the Environment Statistics Section of the United Nations Statistics Division.
- It is based on Chapter 3 of the Framework for the Development of Environment Statistics (FDES) 2013 that can be downloaded here: <http://unstats.un.org/unsd/statcom/doc13/BG-FDES-Environment.pdf>

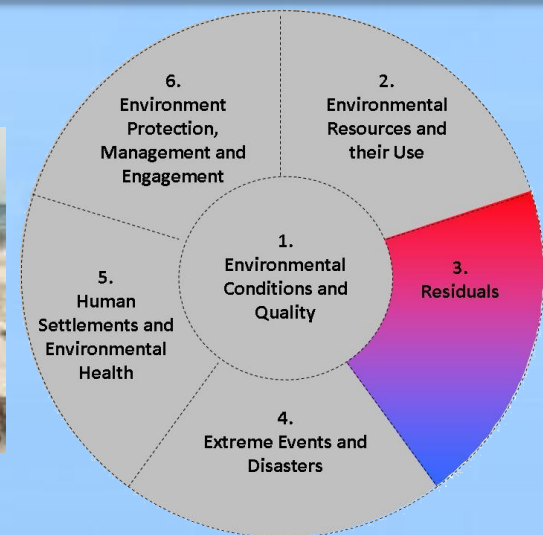


# Component 3: Residuals



# Contents of Component 3: Residuals

- ❖ Contains statistics on the generation and release of residuals generated by production, consumption and accumulation processes.
- ❖ Analyses residuals by type of receiving environment (air, water or soil) and by type of substance, and type of substance.



# Component 3: Residuals

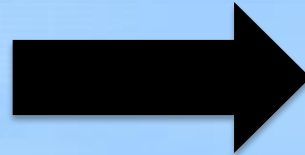
- ❖ Contains statistics on the amount and characteristics of residuals generated by human production and consumption processes, their management, and their final release to the environment.
- ❖ Residuals:
  - ❖ Include: Solid, liquid and gaseous materials that are discarded, discharged or emitted through processes of production, consumption and accumulation.
  - ❖ May be discarded, discharged or emitted directly to the environment or be captured, collected, treated, recycled or reused.
- ❖ The main groups of residuals are emissions, wastewater and waste.

# Component 3: Overview

<b>Component 3 Residuals</b>	<b>Sub-Component 3.1 Emissions to Air</b> (three topics, 20 statistics)	<b>Topic 3.1.1:</b> Emissions of Greenhouse Gases <b>Topic 3.1.2:</b> Consumption of Ozone Depleting Substances <b>Topic 3.1.3:</b> Emissions of other substances
	<b>Sub-Component 3.2 Generation and Management of Wastewater</b> (three topics, 11 statistics)	<b>Topic 3.2.1:</b> Generation and pollutant content of wastewater <b>Topic 3.2.2:</b> Collection and treatment of wastewater <b>Topic 3.2.3:</b> Discharge of wastewater to the environment
	<b>Sub-Component 3.3 Generation and Management of Waste</b> (two topics, 20 statistics)	<b>Topic 3.3.1:</b> Generation of waste <b>Topic 3.3.2:</b> Management of waste
	<b>Sub-Component 3.4 Release of Chemical Substances</b> (one topic, 6 statistics)	<b>Topic 3.4.1:</b> Release of chemical substances

# Sub-Component 3.1: Emissions to Air

**Sub-Component 3.1**  
**Emissions to Air**



**Topic 3.1.1:**

Emissions of  
Greenhouse Gases

**Topic 3.1.2:**

Consumption of Ozone  
Depleting Substances

**Topic 3.1.3:**

Emissions of other  
substances



## Sub-Component 3.1: Emissions to Air

- ❖ Emission of pollutants to ambient air from socio-economic processes. The statistical description of such emissions covers their sources and the quantities emitted by substances.
- ❖ Important to produce statistics in accordance to ISIC economic activities.
- ❖ The groups of different chemicals relevant to statistics on emissions to air include:

Sulphur compounds; oxidized nitrogen compounds and oxidants; reduced nitrogen compounds; inorganic carbon compounds; halogen and inorganic halogen compounds; volatile organic compounds; heavy metals; and different fractions of particulate matter (PM).



### Topic 3.1.1: Emissions of Greenhouse Gases

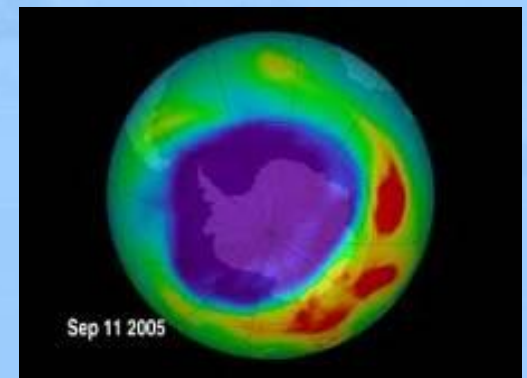
- ❖ The most important direct GHGs are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O).
- ❖ The most important indirect GHGs are sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>).
- ❖ Emission inventories of GHGs are compiled according to guidelines developed by IPCC, used by the United Nations Framework Convention on Climate Change (UNFCCC).
- ❖ The source categories of GHG emissions are based on processes.
- ❖ For official statistics emissions sources should be classified according to ISIC in order to link them to the economic activity that generates the emission.



## Sub-Component 3.1: Emissions to Air

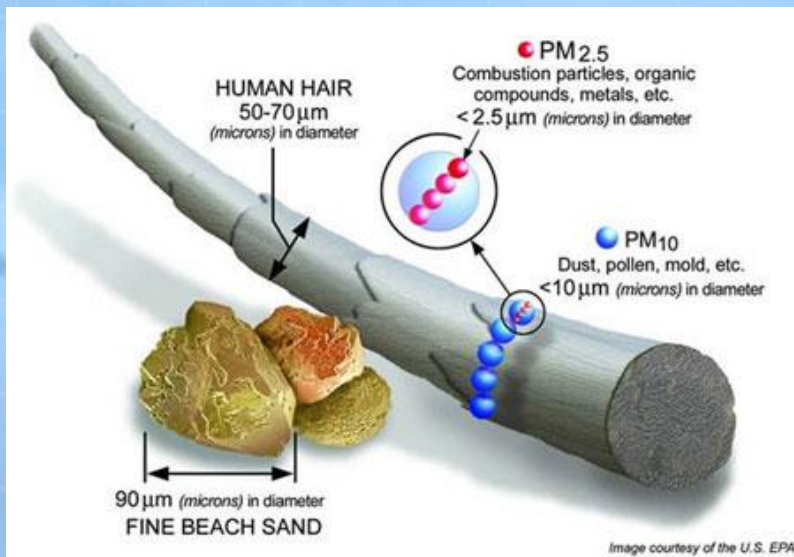
### Topic 3.1.2: Consumption of Ozone Depleting Substances

- ❖ ODS are actively monitored by the Montreal Protocol.
- ❖ Reported statistics worldwide have shown this protocol to be very effective in phasing out the use of these substances.
- ❖ Examples of ODS:
  - Chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Halons, Methyl chloroform, Carbon tetrachloride, Methyl bromide.
- ❖ However, as emissions of these substances are difficult to measure directly, countries report on the apparent consumption of ODS (production +imports-exports).



### Topic 3.1.3: Emissions of other substances

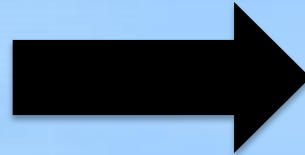
- ❖ Various other environmentally important substances emitted to air beyond GHGs and ODS. Most important:
  - different fractions of PM (**PM<sub>2.5</sub>**, **PM<sub>10</sub>**).
  - heavy metals and others linked to environmental/health problems.
- ❖ There are a variety of other emissions that countries may wish to measure or estimate based on national circumstances and priorities.



# Sub-Component 3.2: Generation and Management of Wastewater

## Sub-Component 3.2

### Generation and Management of Wastewater



### Topic 3.2.1

Generation and pollutant content of wastewater

### Topic 3.2.2

Collection and treatment of wastewater

### Topic 3.2.3

Discharge of wastewater to the environment



## Sub-Component 3.2: Generation and Management of Wastewater

- ❖ Wastewater statistics include generation, treatment and discharge of wastewater, as well as the pollutant content of this wastewater.
- ❖ Disaggregation: by economic activity of responsibility for its generation, by existence and type of treatment, and emissions of pollutants to water bodies in the country.



## Sub-Component 3.2: Generation and Management of Wastewater

### Topic 3.2.1: Generation and pollutant content of wastewater

- ❖ Includes statistics on the volume of wastewater generated and the pollutant content of wastewater after the use of water by economic activities and households, before any collection or treatment is applied.
- ❖ Generation of wastewater is usually estimated based on the volume of water used. The wastewater generated can be discharged directly to the environment by the generator or it can be collected in sewerage systems and treated in wastewater treatment plants.
- ❖ Wastewater generation can be disaggregated by economic activity and households where statistics permit.
- ❖ The pollutant content of wastewater (emissions to water) can usually be obtained from monitoring at the place of generation or from estimates based on technological parameters.

## Sub-Component 3.2: Generation and Management of Wastewater

### Topic 3.2.2: Collection and treatment of wastewater

Include statistics describing:

- (i) Volumes of collected and transported wastewater to their final place of discharge or to treatment facilities
- (ii) Volume of wastewater treated by type of treatment (primary, secondary and tertiary)
- (iii) Physical infrastructure related to wastewater collection and treatment (e.g., number of treatment plants, capacities of plants, etc.)
- (iv) Pollutant content extracted in the treatment facilities

Establishments engaged in the collection and treatment of wastewater are grouped under ISIC Rev.4, Section E, Division 37 Sewerage.

### Topic 3.2.3: Discharge of wastewater to the environment

#### Scope:

- ❖ This topic captures information at the stage of final discharge of wastewater to the environment. It includes:
  - (i) volume of wastewater discharged to the environment without treatment
  - (ii) volume of wastewater discharged to the environment after treatment, by type of treatment (primary, secondary and tertiary) and type of treatment facility (public, private, municipal, industrial)
  - (iii) effluent quality

#### Source:

- ❖ Statistics on the volume of wastewater discharged after treatment can be obtained from administrative records of the treatment plants.
- ❖ Statistics on the volume of wastewater released without treatment can be obtained from economic units and records of sewerage companies, or estimated on the basis of water use. The volume of discharged wastewater should also be disaggregated according to the recipient water body.



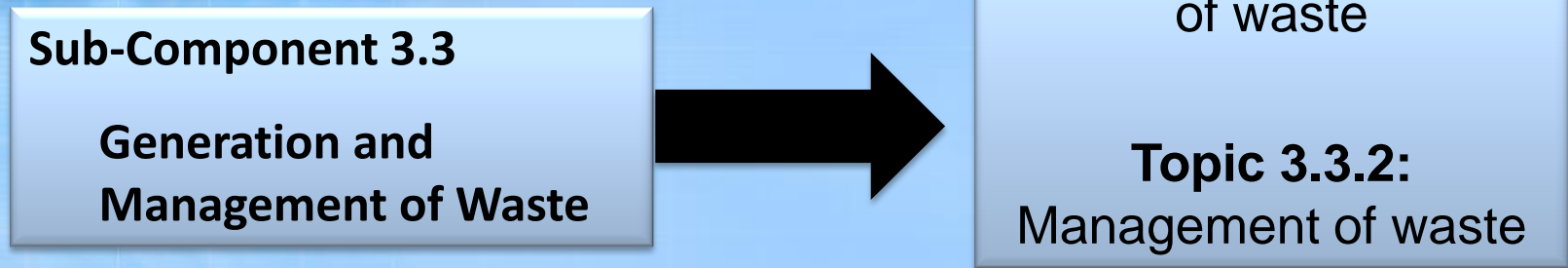
### Topic 3.2.3: Discharge of wastewater to the environment

#### Emissions of pollutants to water bodies:

- ❖ In addition to the volume of wastewater returned to the environment, it is also important to measure or estimate the volumes of different pollutants that are emitted with the wastewater or otherwise released to water bodies.
- ❖ Emissions to water are the substances released to water resources by establishments and households as a result of production, consumption and accumulation processes.
- ❖ Emissions to water should be disaggregated according to the releasing economic activities and should cover the most important substances.



# Sub-Component 3.3: Generation and Management of Waste



## Sub-Component 3.3: Generation and Management of Waste

- ❖ Includes statistics on the amount and characteristics of waste, that is discarded material for which the owner or user have no further use, generated by human activities in the course of production and consumption processes.
- ❖ Relevant statistics cover the amount of waste generated by different sources that are economic activities (by ISIC categories) and households.
- ❖ Policy makers, particularly local governments, require statistics on waste in order to assess how its generation change over time.



## Sub-Component 3.3: Generation and Management of Waste

### Topic 3.3.1: Generation of waste

#### Content:

This topic includes statistics describing the amount of waste generated by economic units and households before any collection or treatment is applied.

#### Scope:

- ❖ The waste lists used by countries and international organizations are usually based either on the generating process or the material content of the waste, or on the combination of these two aspects.
- ❖ Hazardous waste is a special group of waste that due to its toxic or other hazardous character needs special management; statistics on the generation of hazardous waste should also be included in this topic.
- ❖ Statistics on waste generation (can be estimated) are usually less available than the ones describing their collection and disposal.

**The Basel Convention** focuses on the control of transboundary movements of hazardous waste across international borders and sets up criteria for the environmentally sound management of such waste.

- ❖ Reporting needs originating in this convention include generation, exports and imports of hazardous waste.

## **Sub-Component 3.3: Generation and Management of Waste**

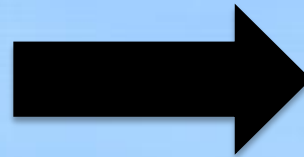
### **Topic 3.3.2: Management of waste**

Includes statistics on:

- (i) The amount of waste collected and transported to treatment facilities or to their final disposal
- (ii) The amount treated by type of treatment or disposal (e.g., recycling, composting, incineration, landfilling)
- (iii) The physical infrastructure for waste treatment, including the number and capacity of treatment plants

# Sub-Component 3.4: Release of Chemical Substances

**Sub-Component 3.4**  
**Release of Chemical Substances**



**Topic 3.4.1:**  
**Release of chemical substances**



# Sub-Component 3.4, Topic 3.4.1: Release of Chemical Substances

## Content:

This topic deals with chemical fertilizers used to enrich soils and pesticides used to protect plants and animals from pests and diseases. Other chemicals accelerate the growth of biota and preserve and enhance the quality, size and appearance of biological products.

## MEA:

- ❖ The Stockholm Convention on Persistent Organic Pollutants (POPs) aims to eliminate or restrict the production and use of POPs. POPs are defined by the convention as “chemical substances that persist in the environment, bio-accumulate through the food web, and pose a risk of causing adverse effects to human health and the environment”.
- ❖ The Stockholm Convention identified an initial twelve chemicals or chemical groups for priority action, including: Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex.



## Sub-Component 3.4: Application of Biochemicals

### Topic 3.4.1: Release of Chemical Substances

Statistics include the amount of natural and chemical fertilizers, pesticides and other chemicals (hormones, pellets etc.) used by type of active ingredients, the area under application, and the method employed.

- ❖ These statistics are proxy for estimating the part of the biochemicals that remain in the environment and affect environmental quality.
- ❖ Environmental effects are generated by the diffusion of biochemicals through cycling systems and build-up of contaminants in water, land and species (through the food chain).







**Questions, comments for Component 3?**



# Thank you for your attention!

For more information please contact the Environment Statistics Section  
at the UN Statistics Division:

E-mail: [envstats@un.org](mailto:envstats@un.org)

website: <http://unstats.un.org/unsd/ENVIRONMENT/>

